

## 2.0 PROJECT DESCRIPTION

Enbridge proposes to construct, operate, and maintain a pipeline system that would transport crude oil from its existing facilities in Hardisty, Alberta, Canada to its existing terminal at Superior, Wisconsin. This section describes Enbridge's proposed action and includes the following information:

- Project Summary (Section 2.1);
- Proposed Facilities (Section 2.2);
- Land Requirements (Section 2.3);
- Construction (Section 2.4);
- Construction Schedule and Workforce (Section 2.5);
- Operation, Maintenance, and Emergency Response (Section 2.6);
- Environmental Compliance, Inspection, and Mitigation Monitoring (Section 2.7); and
- Future Plans and Abandonment (Section 2.8).

In addition, Enbridge is proposing a separate action, the Superior Terminal Expansion Project, which is not part of the Presidential Permit application submitted by Enbridge to DOS. DOS has determined that the proposed Superior Terminal Expansion Project is a connected action for the purposes of this NEPA review. Although the permit applications for that project would be reviewed and acted on by other agencies, its potential impacts are included in the environmental analyses of this EIS. Information on the design, construction, and operation of the connected action is presented in Section 2.9.

### 2.1 PROJECT SUMMARY

The proposed Alberta Clipper Project would be a new pipeline that would transport crude oil from Enbridge's existing facilities in Hardisty, Alberta, Canada to its existing terminal in Superior, Wisconsin. From there, the liquid hydrocarbons would be transported to Midwestern markets, the eastern United States and Canada, and the Midcontinent and U.S. Gulf markets. Crude oil would be transported to markets in the Midwest and beyond via Enbridge's Lakehead System, non-Enbridge pipelines, and potentially through pipelines that may be constructed in the future. The proposed Project would be designed to transport an average crude oil volume of approximately 450,000 bpd.

Overall, the Alberta Clipper Project would consist of a new pipeline and associated facilities in both Canada and the United States. For the purposes of this EIS, the Alberta Clipper Project is considered as the portion that is located in the United States, in accordance with CEQ guidance on NEPA, implementing regulations, and EO 12114 and 13337. The primary components of the U.S. portion of the Project would be the new pipeline, new mainline valves, and additional pumping capacity at three existing pump stations. The pipeline would extend approximately 326.9 miles from the U.S./Canada border near Neche, North Dakota through Minnesota and Wisconsin to the existing Enbridge terminal in Superior, Wisconsin. A total of 32 mainline valves would be installed at key locations along the alignment<sup>1</sup>. The currently proposed route would traverse the FDL Reservation along the existing Enbridge pipeline corridor. Figure 1.1-1 depicts the general location of the Alberta Clipper Project.

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<sup>1</sup> In this EIS, "alignment" and "centerline" refer to the actual linear location of a pipeline, "route" is a less specific term that refers to the approximate linear location of a pipeline, and "corridor" refers to a pipeline route and its surrounding permanent right-of-way.

Approximately 88 percent of the proposed pipeline route in the United States (about 287 miles) would be within or adjacent to an existing Enbridge pipeline corridor<sup>2</sup>. The existing corridor houses six pipelines between the U.S./Canada border and Clearbrook, Minnesota (including the Southern Lights LSr Project pipeline which was constructed in 2008), and four existing pipelines between Clearbrook and Superior. The existing pipelines transport crude oil or petroleum products. A fifth pipeline has been proposed for the corridor between Clearbrook and Superior (see Diluent Project in Section 1.7.1.1), and Enbridge proposes to construct it concurrently with the Alberta Clipper Project pipeline.

Three existing Enbridge pump stations along the corridor would be upgraded to accommodate the Alberta Clipper pipeline. The upgrades would include additional pumps and the associated electrical equipment necessary to power the pumps. New pump stations would not be constructed as a part of the Project.

## **2.2 PROPOSED FACILITIES**

Key aspects of the Alberta Clipper Project, as proposed by Enbridge, are described in the following subsections:

- Pipeline Route Summary (Section 2.2.1);
- Project Design (Section 2.2.2);
- Aboveground Facilities (Section 2.2.3);
- Contractor/Pipe Storage Yards (Section 2.2.4); and
- Access Roads (Section 2.2.5).

### **2.2.1 Pipeline Route Summary**

The proposed Project pipeline would include approximately 326.9 miles of new 36-inch-diameter underground pipe installed primarily within or adjacent to the existing Enbridge pipeline corridor from the U.S./Canada border in Pembina County, North Dakota, near the town of Neche (milepost [MP] 773.7),<sup>3</sup> to Enbridge's existing terminal in Superior (Douglas County), Wisconsin (MP 1098.1). Approximately 12 percent of the route would require establishment of a new corridor that would not be adjacent to the existing corridor. The proposed route is depicted in Figure 1.1-1. Along most of the proposed alignment between Neche and Clearbrook, the pipeline would be installed approximately 25 feet from the Southern Lights LSr Project pipeline; along most of the alignment between Clearbrook and Superior, the pipeline would be installed about 25 feet from the proposed Diluent Project pipeline.

In the initial stages of route selection studies for the Alberta Clipper pipeline, Enbridge based its evaluations on two primary routing assumptions. First, since the new pipeline would have the same origination and destination points as the existing Enbridge pipelines in this area (i.e., originating at the U.S./Canada border near Neche, North Dakota and extending to the existing Superior terminal), installing it adjacent to the existing pipelines would be preferable to constructing a route through undisturbed areas. Such a route would also result in more efficient and effective management of operation and maintenance

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<sup>2</sup> Portions of the existing Enbridge corridor include pipeline routes around features, such as homes, which create areas between existing pipelines that are not part of the permanent right-of-way; technically, in those areas, there are two rights-of-way. However, for the purposes of this EIS, the phrase "within or adjacent to the existing Enbridge rights-of-way" refers to the outer edge of the existing right-of-way.

<sup>3</sup> Mileposts listed are location references and are not definitive measurements of the proposed pipeline alignment. The mileposts originally were established in 1949, when the first pipeline was constructed in the corridor; pipelines installed adjacent to or within this corridor share the milepost reference system.

of the new pipeline when compared to a route that would not be adjacent to the existing pipelines. The second assumption was that, when building a new pipeline adjacent to an existing pipeline, the best location is on the side of the existing right-of-way that was used as the working side for the most recent pipeline construction. This would reduce the extent of environmental impacts by using areas disturbed during previous pipeline construction.

Based on those assumptions, Enbridge evaluated potential alignments adjacent to the right-of-way of an existing pipeline until encountering a physical obstacle that would prevent using Enbridge's initial route or where land was not available for the pipeline. Initially, Enbridge attempted to address obstacles through landowner negotiations, environmental surveys and research, and negotiations of installation methods with environmental agency resource managers. When an obstacle could not be avoided, Enbridge pursued several options, including a short re-route around the obstacle that stayed as close to the initially proposed route as possible; a route that followed another utility corridor; or crossing the Enbridge right-of-way to locate the pipeline alignment adjacent to the opposite side of the existing right-of-way. In choosing among those options, Enbridge endeavored to minimize environmental impacts to the extent possible by choosing the shortest route or the route with the least impacts.

For example, when Enbridge identified a residence along the initial alignment adjacent to the existing right-of-way whose owner was not amenable to Enbridge purchasing the home and relocating, it was necessary to select a route that departed from the existing right-of-way for a short distance to avoid the residence. Another example was the presence of a waterbody in close proximity to the existing right-of-way, such as in the vicinity of the Swan River. In that area, Enbridge selected a route that would cross the waterbody on the opposite side of the existing right-of-way to allow the crossing to be closer to perpendicular and thus be as short a crossing as possible.

## **2.2.2 Project Design**

### **2.2.2.1 Pipe Design**

The pipe for the proposed Project would be American Petroleum Institute (API) 5L Grade X70, double submerged-arc steel pipe with a 36-inch outside diameter. Pipe used for the Project would meet DOT PHMSA federal codes under 49 CFR Part 195 (PHMSA regulations). It would be manufactured and constructed in accordance with standards issued by the American Society of Mechanical Engineers, National Association for Corrosion Engineers, and API. The pipe also would be manufactured in accordance with Enbridge's specification EES103-2006 (included as Exhibit C.b.1 in Enbridge's Presidential Permit application, which is available for viewing at <http://www.albertaclipper.state.gov>). All of the pipe would be manufactured with fusion-bonded epoxy coating to protect against corrosion, and it would be inspected and integrity-tested at the factory.

Pipe wall thickness would range from 0.375 to 0.656 inch, with the thickness dependent on the location of the pipe. The majority of the pipe would have a wall thickness of 0.469 inch. Table 2.2.2-1 lists the pipe wall thickness by location/feature.

<b>TABLE 2.2.2-1</b> <b>Pipe Wall Thickness by Location for the Alberta Clipper Pipeline</b>	
<b>Wall Thickness (inches)</b>	<b>Location of Pipe</b>
0.375	Mainline areas
0.406	Mainline areas and waterbody crossings
0.438	Mainline areas, waterbody crossings, and induction bends
0.469	Mainline areas, waterbody crossings, induction bends, and transitions
0.562	Road crossings, induction bends, and transitions
0.625	Railroad crossings and horizontal directional drilling crossings
0.656	Horizontal directional drills

### 2.2.2.2 Operational Design

The capacity of a liquids pipeline can be expressed in terms of design capacity and annual capacity. “Design capacity” is the theoretical flow rate of a pipeline for a specific type of liquid and is calculated assuming theoretically ideal operating conditions. In liquid petroleum pipelines, the design capacity is the maximum instantaneous throughput that a pipeline is capable of achieving under design conditions for a specific liquid. The design capacity of the Alberta Clipper pipeline would be 500,000 bpd based on the proposed pipeline design and pumping capacity.

“Annual capacity” is the average sustainable throughput over a year and is calculated assuming average annual historical operating conditions, including scheduled and unscheduled maintenance, normal operating problems, and crude supply availability. The annual capacity of a pipeline is typically 90 percent of design capacity. Based on the proposed pipeline design and pumping capacity, the annual capacity of the Project would be approximately 450,000 bpd.

The maximum allowable operating pressure would be 1,313 pounds per square inch, gauge (psig). The pipeline would be designed to withstand pressures over and above normal operating pressures, and would operate according to applicable codes and regulations. The temperature of the oil in the pipe would increase due to friction during pumping. Oil temperatures would generally range from about 40 to 50° Fahrenheit (F) in winter and from about 60 to 75° F in summer. More detailed discussion on oil temperatures is provided in Section 4.2.2.2.

The pipeline would be protected from corrosion by a cathodic protection system, in accordance with the requirements of 49 CFR, Subpart H Corrosion Control (Part 195.563 and Parts 195.567 through 195.577). Enbridge would add the Alberta Clipper Project pipeline to the existing cathodic protection system where the pipeline is within, adjacent to, or near the existing Enbridge pipeline corridor. Where the new alignment would be substantially distant from the existing corridor, a supplemental cathodic protection system would be installed. Enbridge has determined that the cathodic protection system for the Alberta Clipper Project would use existing power supplies (both overhead and underground electrical wires) at 40 locations (ranging between less than a mile and 40 miles apart) that are currently used to power the cathodic protection system for the existing Enbridge pipelines; thus, no new power supplies would be required. Enbridge would use alternating current from existing power lines and transform the current to a low-voltage direct current power supply for the system. Enbridge would initiate operation of the cathodic

protection system as soon as the pipeline installation is completed; cathodic protection would be provided prior to the Project in-service date to protect the pipe from corrosion.

### **2.2.3 Aboveground Facilities**

Aboveground facilities associated with the proposed Project include the portions of mainline valves that are above ground level (Section 2.2.3.1) and modifications at existing pump stations to accommodate the new pipeline (Section 2.2.3.2).

#### **2.2.3.1 Mainline Valves**

Mainline valves are installed along pipelines that transport liquids to limit the volume of a spill if one were to occur. Enbridge conducted an analysis to determine the most appropriate locations for mainline valves in compliance with the requirements of 49 CFR Part 195. Those assessments considered the following key criteria for the placement of mainline valves:

- Each side of waterbody crossings greater than 100 feet wide;
- Locations that would reduce the potential consequence of a release;
- Construction limitations;
- The suction and discharge ends of the pipe at pump stations;
- Presence of potential high-consequence areas (HCAs) as defined by DOT;
- Proximity to densely populated areas;
- Accessibility;
- Operational considerations; and
- Future pipeline expansion potential.

Based on its analysis, Enbridge proposes to install 32 mainline valves along the pipeline. All but four of the valves would be installed in areas near mainline valves of other Enbridge pipelines. Table 2.2.3-1 lists the proposed locations of mainline valves.

The valves would be 36-inch ANSI 600 (American National Standards Institute), weld-end by weld-end, full port, rising-stem gate valves. They would be manufactured in accordance with API Standard 6D, “API Specification for Steel, Gate, Plug, Ball and Check Valves for Pipeline Service,” and Enbridge specification EES105-2006 (included as Exhibit C.b.2 in Enbridge’s Presidential Permit application, which is available for viewing at <http://www.albertaclipper.state.gov>).

The stem and wheel of each mainline valve would extend above ground level, with the remainder of the valve installed below ground. Each valve would be designed for manual operation, and where feasible, existing electrical power lines would be extended to the new valves to allow remote monitoring and operation. The maximum allowable operating pressure of each valve would be 1,480 psig.

<b>TABLE 2.2.3-1</b> <b>Mainline Valve Locations for the Alberta Clipper Pipeline<sup>a</sup></b>			
<b>County, State</b>	<b>Facility</b>	<b>Location</b>	<b>Milepost<sup>b</sup></b>
Pembina, ND	Pembina River Downstream Valve	147 <sup>th</sup> Avenue	776.74
Lincoln, MN	Red River of the North Upstream Valve	163 <sup>rd</sup> Avenue and Access Road	801.13
Kittison, MN	Red River of the North Downstream Valve	Township Highway T-196	805.63
Marshall, MN	Donaldson Station	Donaldson Pump Station	814.10
	Tamarac River Volume Reduction Valve (VRV)	County Road 34	829.28
	Middle River VRV	County Road 111	836.50
Pennington, MN	Viking Station	Viking Pump Station	848.20
	Red Lake River Upstream Valve	State Highway 32	864.10
	Red Lake River Downstream Valve	County Road 75	865.10
Red Lake, MN	Clearwater River Upstream Valve	Township Road 107	875.00
	Clearwater River Downstream Valve	Plummer Pump Station	877.10
Polk, MN	Oaklee/Lost River Risk Reduction Valve (RRV) #1	Off County Road 33, 310 <sup>th</sup> Avenue, SE	888.00
Clearwater, MN	Clearbrook Terminal	Clearbrook Terminal Receiver	909.50
	Clearbrook Terminal	Clearbrook Terminal Launcher	909.51
	West Four Legged Lake Upstream Valve	Main Street	916.35
	West Four Legged Lake Downstream Valve	County Road 23	918.84
Beltrami, MN	Grant Creek Upstream Valve	Pinewood Leak Site <sup>c</sup>	926.50
	Grant Creek Downstream Valve	Wilton Pump Station	928.80
	Mississippi River 1 Upstream Valve	Yellowhead Road	939.42
	Mississippi River 1 Downstream Valve	18th Street	939.94
Cass, MN	Cass Lake Station	Cass Lake Pump Station	953.15
	Sucker Lakes/Portage Tributary Upstream Valve	U.S. Highway 2 and Access Road	964.06
	Sucker Lakes/Portage Tributary Downstream Valve	Ryans Road (Iowana Beach Road, NW) <sup>c</sup>	970.40

<b>TABLE 2.2.3-1 (continued)</b> <b>Mainline Valve Locations for the Alberta Clipper Pipeline<sup>a</sup></b>			
<b>County, State</b>	<b>Facility</b>	<b>Location</b>	<b>Milepost</b>
Cass , MN (continued)	Mississippi River 2/ Ball Club Upstream Valve	Forest Route 2127 and Access Road	985.60
Itasca, MN	Mississippi River 2/Ball Club Downstream Valve	U.S. Highway 2 and Access Road <sup>c</sup>	989.70
	Deer River Station	Deer River Pump Station	995.80
	Prairie River Upstream Valve	Soldier's Lane <sup>c</sup>	1008.71
	Prairie River Downstream Valve	Gunn Road	1011.70
St. Louis, MN	Floodwood Station	Floodwood Pump Station	1044.40
Douglas, WI	Military Road Risk Reduction Valve	Military Road	1087.07
	Pokegama River Risk Reduction Valve	Logan Avenue (Cemetary Road)	1094.01
	Superior Terminal	Superior Terminal Receiver	1098.00

<sup>a</sup> The criteria considered for valve placement are listed in 49 CFR 195 and summarized in the text of Section 2.2.3.1.

<sup>b</sup> Mileposts are used for reference and may not reflect actual distances. The proposed pipeline route starts at MP 773.7 and ends at MP 1098.1, a difference of 324.4 miles; however, the actual length of pipeline would be 326.9 miles because of deviations from the existing milepost-reference pipeline.

<sup>c</sup> Site that does not have a mainline valve in place.

Each mainline valve would be fenced, with a gate provided for access. The fenced areas would be approximately 30 feet wide and 45 feet long. Where mainline valves for the Project would be installed near existing valve sites, the fencing around the existing valves would be extended to include the new valves.

### 2.2.3.2 Pump Station and Terminal Modifications

New pumping units and associated facilities would be installed at three existing Enbridge pump stations in Minnesota: the Viking (MP 848.2), Clearbrook, (MP 909.5), and Deer River (MP 995.8) stations. The new electrically-driven pumps would be about 12 feet in height and mounted on concrete foundations; they would not be housed in buildings. Each new pump would require a below-ground, 4,000-gallon, double-walled fiberglass sump tank to collect any releases that may occur during maintenance activities or from leaks. Oil collected in the tanks would be returned to the pipeline system through sump pumps and injection pumps. Back-up generators would not be installed at the pump stations as a part of the Alberta Clipper Project.

The new pumps would require new electrical gear to reduce incoming voltage to the level required by the pumps (4,160 volts alternating current). At each pump station, the new electrical equipment would be housed in new switchgear buildings that would be approximately 53 feet long, 14 feet wide, and 10 feet high. Each switchgear building also would house a heating and air conditioning unit to maintain appropriate temperatures within the building. In addition, the new pumps at the Viking, Clearbrook, and Deer River Pump Stations would require variable-frequency drive equipment to control pump speed. At each of those pump stations, this new equipment would be housed in a building approximately 40 feet long, 14 feet wide, and 10 feet high.

At the Clearbrook Pump Station, Enbridge also would install a pig sending and receiving trap, additional instrumentation, metering equipment, and connections to existing delivery pipelines.

Within the Superior Terminal, Enbridge would install a pig receiving trap, additional instrumentation, and piping that would connect to an existing distribution manifold.

## 2.2.4 Contractor/Pipe Storage Yards

Construction of the pipeline would require establishment of rail unloading sites for delivery of pipe and contractor/pipe storage yards at locations near the construction right-of-way to temporarily store pipe and the contractor's vehicles, equipment, tools, and other construction-related items. Rail unloading areas would be located adjacent to railroad sidings and would range in size from approximately 5 to 10 acres.

Enbridge has identified 14 pipe storage yards and four contractor yards along the proposed route; all of the yards are in Minnesota. Five of the pipe storage yards and one of the contractor yards were used for the same purpose during construction of the LSr Project. The locations and acreages of the contractor/pipe storage yards are listed in Table 2.2.4-1.

<b>TABLE 2.2.4-1 Contractor/Pipe Storage Yards for the Alberta Clipper Pipeline</b>		
<b>Site Type and Name</b>	<b>Location (All in Minnesota)</b>	<b>Area (Acres)</b>
<b>Pipe Storage Yards</b>		
Kennedy 1 <sup>a</sup>	Kittson County	12.8
Kennedy 3 <sup>a</sup>	Kittson County	22.8
Viking <sup>a</sup>	Marshall County	15.1
Trail 1 <sup>a</sup>	Polk County	17.8
Trail 2	Polk County	27.9
Trail 3 <sup>a</sup>	Polk County	10.0
Potlatch	Hubbard County	16.4
Rosby 12	Hubbard County	53.0
Rosby 16	Hubbard County	31.7
Rosby 13	Hubbard County	52.0
Rosby 14	Hubbard County	45.0
Deer River 1	Itasca County	61.0
Floodwood	St. Louis County	28.1
Carlton 1	Carlton County	41.5
<b>Contractor Yards</b>		
Cloquet	Carlton County	150.0
Bemidji	Beltrami County	40.0
Grand Rapids	To be determined	60.0
Thief River Falls <sup>a</sup>	Marshall County	13.0

<sup>a</sup> Used for the Southern Lights LSr Project.



The primary improvements at these sites would consist of the installation of erosion controls, clearing and grading as necessary, placement of gravel for access road extensions to the sites, and berms for material storage. In addition, erosion controls would be installed as required by the Enbridge state-specific Environmental Mitigation Plans (EMPs) (Appendix C) and the Stormwater Pollution Prevention Plan (SWPPP) approved by the Minnesota Pollution Control Agency (MPCA) for each site. After completion of Project construction, the sites would be restored by removing berms and gravel access roads, cleaning and regrading (as necessary), and removing temporary erosion and sedimentation controls. Each SWPPP would include criteria for determining when the site restoration is considered complete and would require that the site be restored to approximately the pre-construction condition unless Enbridge has other agreements with the landowner.

Construction vehicles and powered equipment would typically be refueled by fuel trucks along the construction right-of-way. All refueling and the use of fuel, lubricants, waste oil, and other regulated substances would be accomplished in accordance with the Enbridge Spill Prevention, Containment, and Control Plan, or SPCC Plan as it is referred to by Enbridge (included in Appendix E). Enbridge's state-specific EMPs (Appendix C) also provide procedures for refueling practices. Key requirements from these two plans include the following:

- Fuel storage must be at contractor yards only or as approved by Enbridge.
- Tools and materials to stop the flow of leaking tanks and pipes must be kept on-site.
- Spill kits must be located at fuel storage areas.
- Fuels, lubricants, waste oil, and any other regulated substances must be stored in aboveground tanks only.
- Storage tanks and containers must conform to all applicable industry codes.
- A suitable secondary containment structure must be utilized at each fuel storage site. These structures must be lined with suitable plastic sheeting, provide a minimum containment volume equal to 150 percent of the volume of the largest storage vessel, and provide at least 1 foot of freeboard.
- If earthen containment dikes are used, they must be constructed with slopes no steeper than 3:1 (horizontal to vertical) to limit erosion and provide structural stability.
- Secondary containment areas must not have drains. Precipitation may be drawn off as necessary. If visual inspection indicates that no spillage has occurred in the secondary containment structure, accumulated water may be drawn off and sprayed on the surrounding upland areas. If spillage has occurred in the structure, accumulated waste shall be drawn off and pumped into drum storage for proper disposal.
- Vehicle maintenance wastes, including used oils and other fluids, must be handled and managed by personnel trained in the procedures outlined in the SPCC Plan and stored and disposed of in accordance with the SPCC Plan.
- Fuels must be dispensed by authorized personnel during daylight hours only.
- Personnel must be stationed at both ends of the hose during fueling unless both ends are visible and are readily accessible by one person.

Enbridge requires that the storage of petroleum products, refueling, lubricating, and maintenance operations take place in upland areas that are more than 100 feet from wetlands, streams, other waterbodies (including drainage ditches), and water supply wells. In addition, Enbridge must store

hazardous materials, chemicals, fuel and lubricating oils, and must perform concrete coating activities, outside these areas. In certain instances, refueling or fuel storage within the 100-foot buffer may be unavoidable due to site-specific conditions or unique construction requirements. These locations must be identified by Enbridge and approved in advance by the Environmental Inspector (see Section 2.7.1). Site-specific precautions, in addition to those practices described above, will be taken when refueling or maintenance activities are required within 100 feet of streams, wetlands or other waterbodies. Key precautions to be taken by Enbridge include the following:

- Adequate amounts of absorbent materials and containment booms must be kept on hand by each construction crew to enable the rapid cleanup of any spill that may occur;
- If fuel must be stored within wetlands or near streams for refueling of continuously operating pumps, secondary containment must be provided;
- Secondary containment structures must be lined with suitable plastic sheeting, provide a containment volume of at least 150 percent of the storage vessel, and allow for at least 1 foot of freeboard; and
- Adequate lighting of these locations and activities must be provided.

## **2.2.5 Access Roads**

### **2.2.5.1 Access to the Right-of-Way**

Enbridge would need to gain access to the construction right-of-way during pipeline installation and to the permanent right-of-way during operation. In general, Enbridge would use existing public roads to gain access to the construction right-of-way as much as possible. In areas where public roads are limited, existing privately owned roads would be used for access, provided that Enbridge receives permission from the landowners. Enbridge does not expect that any new access roads would be required for installation or operation of the proposed pipeline.

Enbridge has identified 128 access roads for the Project; the access roads are depicted on the environmental planning sheets presented in Appendix D. These would total approximately 54.5 miles of access roads, with the length of the roads ranging from less than 0.1 to 9.9 miles, and an estimated total area of 198.1 acres. Because these access roads are existing roads, potential modifications or improvements to the roads would be limited to minor vegetation clearing or grading. Currently, Enbridge is working to identify the specific modifications that would be required.

Of the 128 access roads, 58 are pending environmental review and approval by Enbridge. Environmental and engineering surveys of those roads are continuing. The surveys are being conducted based on the assumption that the roads would be 30 feet wide, although Enbridge anticipates that the actual width required for most roads would be less than 30 feet.

The environmental reviews are being conducted for (1) all non-public access roads identified for potential use by the contractor, with the review level commensurate with the potential impact; and (2) roads that would require modification for Project use (e.g., if a road would require grading, filling, widening, or straightening). The review includes a wetland field review, a database search of threatened and endangered species, an archaeology field survey, and an evaluation of permit or regulatory issues.

Enbridge would prohibit or restrict use of a potential access road if the environmental review identifies any of the following conditions, unless otherwise approved by the appropriate agency:

- The presence of wetlands (no improvements beyond temporary timber mats would be allowed within the wetland);
- A Phase 2 investigation is deemed necessary during archaeological review; or
- A protected species is identified as being present in the vicinity of the proposed access road.

In addition, construction equipment would need to travel across public roads that are crossed by the construction right-of-way. At these crossings, Enbridge would install temporary ramps or driveways at the sides of the roads to allow construction vehicles to access and cross the roadway. These temporary facilities would consist of a flume pipe covered with dirt, rock, or gravel.

### **2.2.5.2 Access Roads to Mainline Valves**

Mainline valves for the Alberta Clipper pipeline would be installed in areas where existing mainline valves and their associated access roads are present or near existing roadways. Enbridge would not construct new access roads for the mainline valves.

## **2.3 LAND REQUIREMENTS**

The proposed pipeline alignment generally would follow an existing Enbridge right-of-way along the route in North Dakota, Minnesota, and Wisconsin. It would cross portions of the following counties: Pembina County in North Dakota; Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St. Louis, and Carlton Counties in Minnesota; and Douglas County in Wisconsin. Table 2.3-1 summarizes the length of proposed pipeline in each county.

Table 2.3-2 summarizes the land requirements for the proposed Project pipeline and aboveground facilities; additional information on the acreages impacted during construction and operation are presented in Section 4.9. Between Clearbrook and Superior, the Alberta Clipper pipeline would be constructed concurrently with the Diluent Project pipeline; the acreages in Table 2.3-2 include construction and permanent rights-of-way for both pipelines. Assessments of the resource impacts associated with the proposed uses within both of the rights-of-way are included in the resource sections of this EIS (i.e., throughout Section 4.0).

<b>TABLE 2.3-1</b> <b>Pipeline Lengths by County for the Alberta Clipper Pipeline</b>	
<b>County, State</b>	<b>Approximate Pipeline Length (miles)<sup>a</sup></b>
<b>North Dakota</b>	
Pembina	28
<b>Minnesota</b>	
Kittson	15
Marshall	35
Pennington	20
Red Lake	16
Polk	14
Clearwater	21
Beltrami	23
Hubbard	8
Cass	34
Itasca	50
Aitkin	1
St. Louis	25
Carlton	24
<i>Subtotal Minnesota</i>	<i>286</i>
<b>Wisconsin</b>	
Douglas	13
<b>Total</b>	<b>327</b>

<sup>a</sup> Mileages rounded to the nearest whole number; actual total mileage is 326.9.

<b>TABLE 2.3-2</b> <b>Summary of Land Requirements for the Alberta Clipper Pipeline<sup>a</sup></b>		
<b>Facility</b>	<b>Width</b>	<b>Area Affected (acres)<sup>d</sup></b>
<b>Pipeline Facilities</b>		
Temporary construction right-of-way <sup>b</sup>	140 feet	6,402.1
New permanent right-of-way <sup>c</sup>	25 feet (Neché to Clearbrook) and 75 feet (Clearbrook to Superior)	2,244.2

<sup>a</sup> Acreage listed includes land required for the Southern Lights Diluent Project between the Superior Terminal and the Clearbrook Pump Station. Aboveground facilities associated with the Project would be constructed within the same construction right-of-way as the pipeline or within the footprint of the existing Enbridge facilities that are within the existing right-of-way.

<sup>b</sup> Temporary construction right-of-way acreages include extra workspaces, access roads, pump stations and delivery facilities and contractor/pipe storage yards.

<sup>c</sup> New permanent right-of-way data are approximate. Enbridge would acquire sufficient right-of-way to maintain the outer edge of the right-of-way at 75 feet from the current outermost pipeline, except where the proposed route would not be adjacent to the existing corridor.

## 2.4 CONSTRUCTION

The construction right-of-way and the procedures that would be followed during construction are described in the following subsections:

- Construction Right-of-Way (Section 2.4.1);
- Typical Pipeline Construction Procedures (Section 2.4.2);
- Special Pipeline Construction Procedures (Section 2.4.3); and
- Construction of Aboveground Facilities (Section 2.4.4).

This section also includes summary information on the procedures that Enbridge would follow to mitigate or avoid potential impacts and to respond to emergencies. Additional information on those and other mitigation procedures is presented in the resource assessments in Section 4.0 and in the following documents:

- SPCC Plan (Appendix E);
- Minnesota Agricultural Mitigation Plan (AMP) (Appendix F);
- State-Specific Environmental Mitigation Plans (Appendix C);
- Drilling Mud Containment, Response, and Notification Plan (Appendix G);
- State-Specific Noxious Weeds and Invasive Species Control Plans (Appendix H);
- Anthrax Mitigation Plan (Appendix I);
- Petroleum-Contaminated Soil Management Plan (Appendix J);
- State-Specific Revegetation and Restoration Monitoring Plans (Appendix K);

- Blasting Plan (Appendix L); and
- Construction Environmental Control Plan (Appendix M).

### **2.4.1 Construction Right-of-Way**

The Alberta Clipper pipeline would be installed within or adjacent to the existing Enbridge right-of-way along the majority of its route. Enbridge has identified 42 locations where the construction right-of-way would be 85 feet or more from the existing right-of-way due to the need to avoid conflicts with existing land uses. The total distance of those 42 sections of the route would be approximately 40 miles, or about 12 percent of the total route.

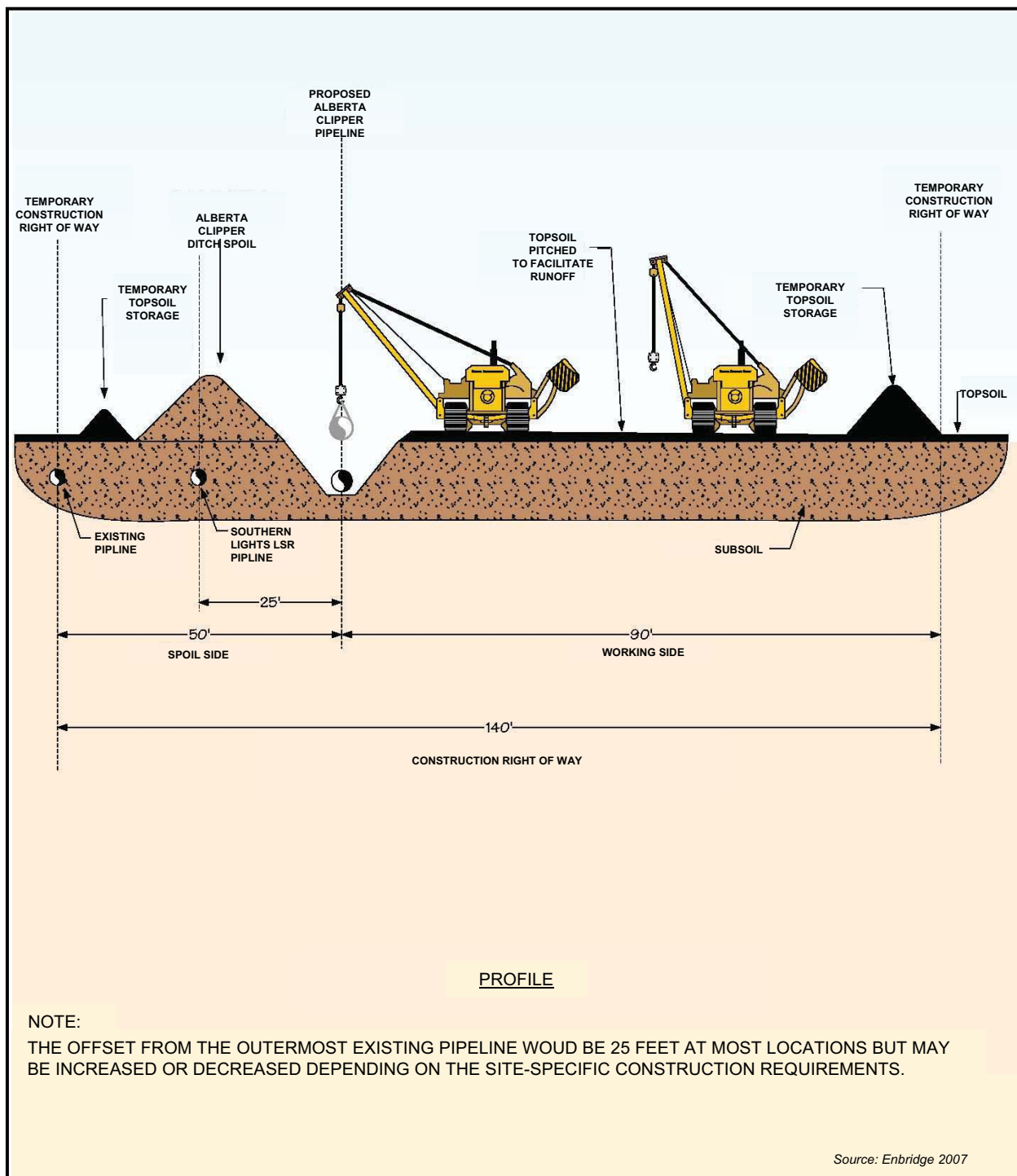
Along most of the route, construction activities would require a 140-foot-wide construction right-of-way. In wetland areas, the total width of the construction right-of-way would be reduced to 125 feet, except where construction through wetlands is conducted during winter. In those areas, the construction right-of-way would be 140 feet as described in Section 2.4.3.1.

From Necho to Clearbrook, the pipe would be generally installed approximately 25 feet from the Southern Lights LSr Project pipeline. Along that portion of the proposed route, the spoil side (the area used to store topsoil and excavated material) typically would be approximately 35 to 50 feet wide and within Enbridge's existing maintained right-of-way. The working side (equipment work area and travel lane) typically would be 90 feet wide and generally outside of Enbridge's existing maintained right-of-way. Figures 2.4.1-1 and 2.4.1-2 depict the construction right-of-way between Necho and Clearbrook.

Between Clearbrook and Superior, the Alberta Clipper Project and the Diluent Project (see Section 1.7.1.1) would be constructed within the same corridor at approximately the same time. The spoil side of the construction right-of-way typically would be approximately 50 feet wide and within Enbridge's existing maintained right-of-way. The working side of the construction right-of-way typically would be 90 feet wide and outside of Enbridge's existing maintained right-of-way. Figures 2.4.1-3 and 2.4.1-4 depict the construction right-of-way between Clearbrook and Superior.

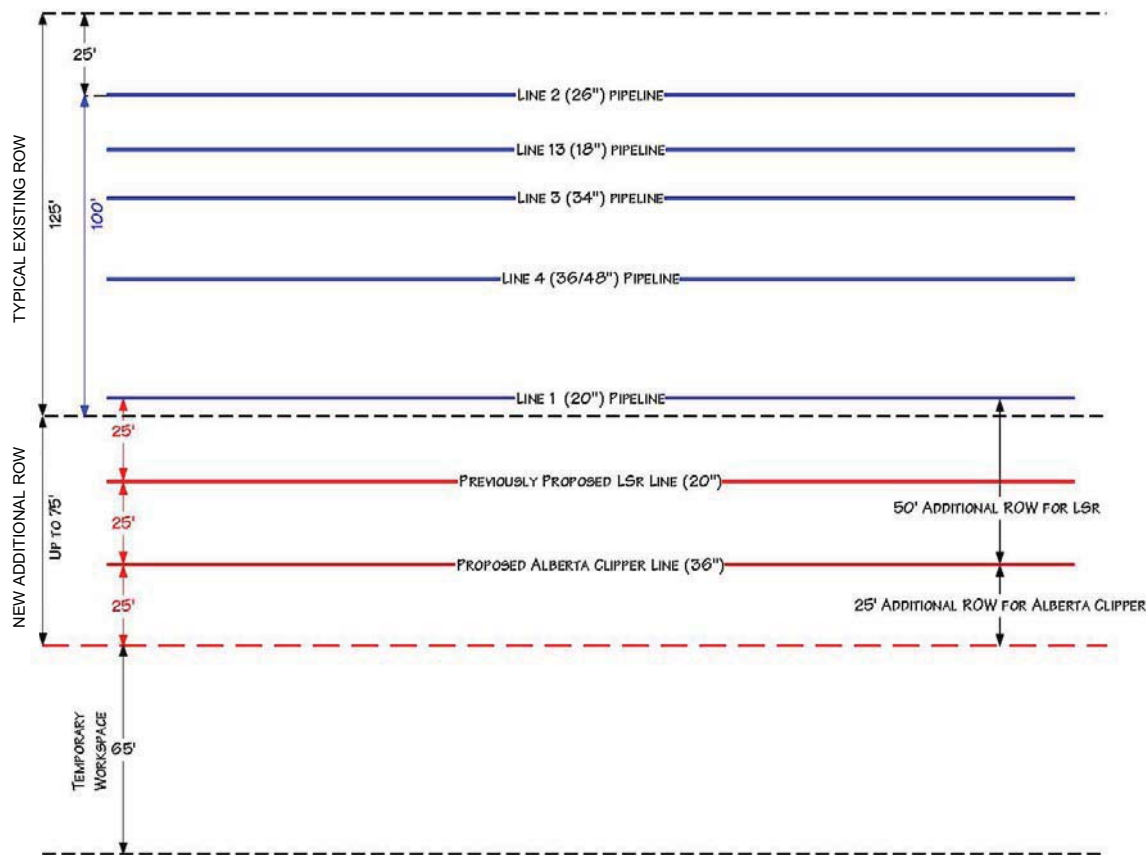
The construction right-of-way, extra workspace areas, existing pipelines, access roads, and key environmental features along the route are depicted on the environmental planning sheets presented in Appendix D.

Enbridge has agreed to, or is attempting to obtain, new right-of-way agreements with landowners along the proposed route. Negotiations would be for easements for construction, including extra workspace, (see Section 2.4.1.1) or for construction and operation, depending on the parcel. Landowners would receive financial compensation for the easements, including compensation for temporary loss of use during construction, crop damages, and restoration of damage that may occur during construction. If an easement cannot be negotiated with the landowner, Enbridge may seek to obtain the easement through the eminent domain process, which is a state-regulated process (DOS has no eminent domain powers). Additional information on eminent domain is provided in Section 4.9.2.1.



## ALBERTA CLIPPER PROJECT

**FIGURE 2.4.1-1  
TYPICAL CONSTRUCTION LAYOUT  
NECHE, ND TO CLEARBROOK, MN**



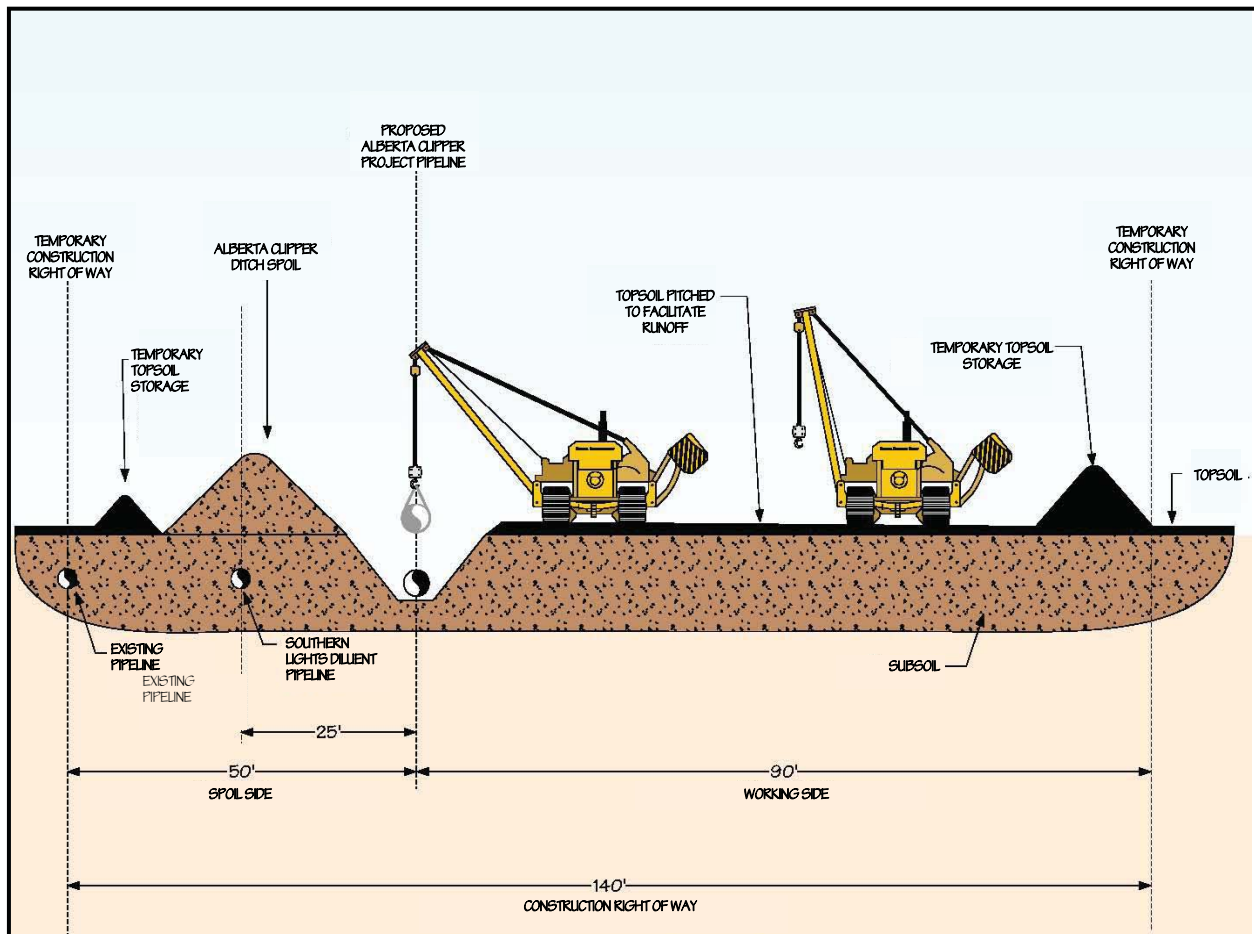
- TYPICAL EXISTING ROW BOUNDARY DEFINED BY LOCATION OF NORTHERNMOST PIPELINE: 25 FEET TO THE NORTH AND 100 FEET TO THE SOUTH.
- BECAUSE PIPELINE SPACING VARIES DUE TO CONSTRUCTION REQUIREMENTS AT THE TIME OF INSTALLATION, THE DISTANCE BETWEEN THE SOUTHERNMOST LINE (LINE 1(20")) AND THE SOUTHERN EXISTING ROW BOUNDARY VARIES BETWEEN 0 AND 35 FEET.
- NEW ADDITIONAL ROW REQUIREMENTS WOULD VARY ALONG THE PROPOSED ROUTE FROM THE MINNESOTA/NORTH DAKOTA BORDER TO CLEARBROOK, MINNESOTA. THESE ROW REQUIREMENTS WOULD DEPEND ON THE LOCATION OF ENBRIDGE'S SOUTHERNMOST EXISTING LINE AND THE EXISTING ROW BOUNDARY. ENBRIDGE WOULD NEED UP TO 50 FEET OF ADDITIONAL PERMANENT ROW FOR THE LSR PROJECT AND ANOTHER 25 FEET OF PERMANENT ROW FOR THE ALBERTA CLIPPER PROJECT. THE ADDITIONAL 25 FEET OF THE PERMANENT ROW FOR THE ALBERTA CLIPPER PROJECT WOULD BE NECESSARY TO ALLOW FOR APPROXIMATELY 25-FOOT SPACING BETWEEN THE PROPOSED LSR AND ALBERTA CLIPPER PROJECTS, WHILE ALSO ALLOWING FOR A BUFFER TO THE SOUTHERNMOST PERMANENT ROW BOUNDARY.
- TEMPORARY WORKSPACE ADJACENT TO NEW ADDITIONAL ROW WOULD BE REQUIRED TO INSTALL THE PIPELINE. TYPICALLY 65 FEET IN WIDTH AND THE LENGTH OF THE ROW WOULD BE RENTED FROM LANDOWNERS. ADDITIONAL TEMPORARY WORKSPACE AT CIVIL AND ENVIRONMENTAL CROSSINGS OF UP TO 75 FEET IN WIDTH AND UP TO 300 FEET IN LENGTH ON EACH SIDE OF THE CROSSING WOULD BE RENTED.

Source: Enbridge 2009

## ALBERTA CLIPPER PROJECT

**FIGURE 2.4.1-2  
TYPICAL RIGHT-OF-WAY CONFIGURATION  
NECHE, ND TO CLEARBROOK, MN**





#### PROFILE

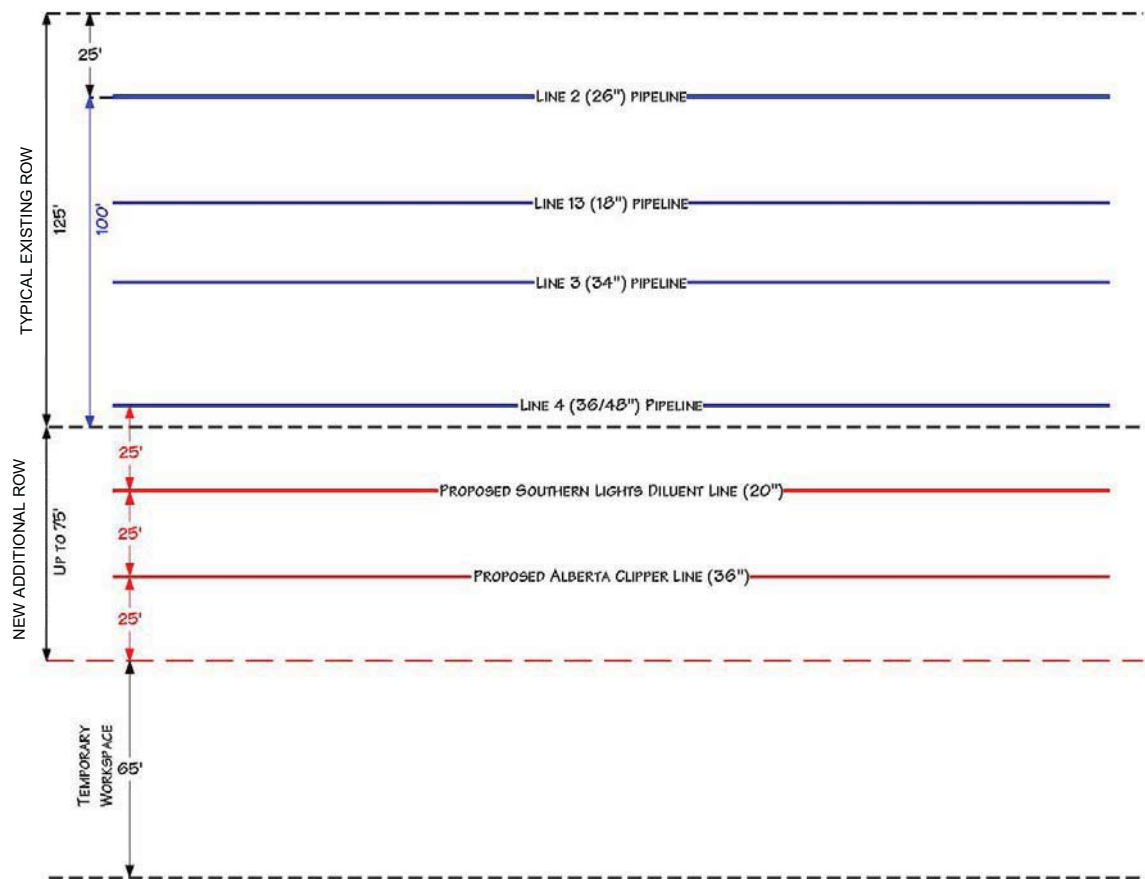
#### NOTE:

THE OFFSET FROM THE OUTERMOST EXISTING PIPELINE WOULD BE 25 FEET AT MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE-SPECIFIC CONSTRUCTION REQUIREMENTS.

Source: Enbridge 2007

## **ALBERTA CLIPPER PROJECT**

**FIGURE 2.4.1-3  
TYPICAL CONSTRUCTION LAYOUT  
CLEARBROOK, MN TO SUPERIOR, WI**



- TYPICAL EXISTING ROW BOUNDARY DEFINED BY LOCATION OF NORTHERNMOST PIPELINE: 25 FEET TO THE NORTH AND 100 FEET TO THE SOUTH.
- BECAUSE PIPELINE SPACING VARIES DUE TO CONSTRUCTION REQUIREMENTS AT THE TIME OF INSTALLATION, THE DISTANCE BETWEEN THE SOUTHERNMOST LINE AND SOUTHERN EXISTING ROW BOUNDARY VARIES BETWEEN 0 AND 35 FEET.
- NEW ADDITIONAL ROW REQUIREMENTS FOR THE ALBERTA CLIPPER AND SOUTHERN LIGHTS DILUENT PROJECTS WOULD VARY ALONG THE PROPOSED ROUTE FROM CLEARBROOK, MINNESOTA TO MINNESOTA-WISCONSIN BORDER. THESE ROW REQUIREMENTS WOULD DEPEND ON THE LOCATION OF ENBRIDGE'S SOUTHERNMOST EXISTING LINE AND THE EXISTING ROW BOUNDARY. ENBRIDGE WOULD NEED UP TO 75 FEET OF PERMANENT ROW FOR THE ALBERTA CLIPPER AND SOUTHERN LIGHTS DILUENT PIPELINES WHICH WOULD BE NECESSARY TO ALLOW FOR APPROXIMATELY 25-FOOT SPACING BETWEEN THE SOUTHERN LIGHTS DILUENT AND ALBERTA CLIPPER PROJECTS, WHILE ALSO ALLOWING FOR A BUFFER TO THE SOUTHERNMOST PERMANENT ROW BOUNDARY.
- TEMPORARY WORKSPACE ADJACENT TO NEW ADDITIONAL ROW WOULD BE REQUIRED TO INSTALL THE PIPELINE(S). TYPICALLY 65 FEET IN WIDTH AND THE LENGTH OF THE ROW WOULD BE RENTED FROM LANDOWNERS. ADDITIONAL TEMPORARY WORKSPACE AT CIVIL ENVIRONMENTAL CROSSINGS OF UP TO 75 FEET IN WIDTH AND UP TO 300 FEET IN LENGTH ON EACH SIDE OF THE CROSSING WOULD BE RENTED.

Source: Enbridge 2009

## ALBERTA CLIPPER PROJECT

**FIGURE 2.4.1-4  
TYPICAL RIGHT-OF-WAY CONFIGURATION  
CLEARBROOK, MN TO SUPERIOR, WI**

### 2.4.1.1 Extra Workspace Areas

Extra construction workspace areas would be needed where the proposed route crosses features such as waterbodies, some wetland crossings, steep slopes, roads, railroads, and existing pipelines and utilities. These extra workspaces, which would be outside of the typical construction right-of-way, would be used to stage equipment and stockpile excavated material. Schematics showing the dimensions of typical extra workspaces are provided in Appendix N, and the locations of extra workspace areas are identified on the environmental planning sheets in Appendix D. Table 2.4.1-1 lists the typical dimensions of extra workspaces that would be used for pipeline construction.

<b>TABLE 2.4.1-1 Typical Dimensions of Extra Workspace Areas for the Alberta Clipper Pipeline</b>	
<b>Feature</b>	<b>Workspace Area <sup>a</sup></b>
Open-cut road crossings	100 feet x 75 feet <sup>b</sup> and 50 feet x 50 feet <sup>c</sup>
Bored road and railroad crossings	100 feet x 75 feet <sup>b</sup> and 100 feet x 50 feet <sup>c</sup>
Foreign pipeline and utility crossings	100 feet x 75 feet <sup>b</sup> and 100 feet x 50 feet <sup>c</sup>
Pipeline cross-unders	100 feet x 75 feet <sup>d</sup>
Waterbody crossings >50 feet wide	300 feet x 75 feet <sup>d</sup>
Waterbody crossings <50 feet wide	200 feet x 75 feet <sup>d</sup>
Horizontal directionally drilled waterbody crossings	200 feet x 75 feet <sup>d</sup>
Wetland crossings	200 feet x 75 feet <sup>d</sup>

<sup>a</sup> Areas listed are in addition to the 140-foot-wide construction right-of-way.

<sup>b</sup> Entry side.

<sup>c</sup> Exit side.

<sup>d</sup> Each side.

Enbridge initially identified extra workspace requirements using field surveys, geotechnical data, and reviews by the contractors. Throughout the period when the EIS was being prepared, Enbridge has continued to refine the extra workspace requirements for the Project; to the degree possible at this stage of the Project, Enbridge has stated that it has adequately defined the extra workspace requirements needed to construct the Project. However, it is expected that refinement of extra workspace areas would continue during the pre-construction phase of the proposed Project. Additional extra workspace areas may be needed as determined by site conditions at the time of construction. If additional extra workspace is needed beyond the areas identified in this EIS, Enbridge would seek approval from the appropriate agencies for establishing each workspace prior to use of an area.

To minimize the impacts of extra workspace areas, Enbridge limited each such area to the minimum size needed. Extra workspaces would typically be established in uplands adjacent to the construction right-of-way and set back 50 feet from sensitive resource boundaries, such as wetlands and the ordinary high water mark of waterbodies. Where appropriate, erosion and sediment control devices would be placed between the extra workspace and sensitive resources to provide further protection. Where woody vegetation is present in the extra workspace, clearing would be limited to the extent practical.

### 2.4.1.2 Aboveground Facility Work Areas

Mainline valves would be installed within the same construction right-of-way as that of the pipeline. The new pumps and associated facilities required at the three existing pump stations would require the following area: 3.2 acres at the Viking Pump Station, 2.1 acres at the Deer River Pump Station, and

1.8 acres at the Clearbrook Pump Station (which is located within the boundaries of the Clearbrook Terminal). At the Viking Pump Station, all facilities would be constructed on Enbridge's existing property but would be outside of and adjacent to the existing fenced area. At the Deer River Pump Station, all new facilities except the electrical switchgear building would be within the existing fence line; the area required outside of and adjacent to the existing station would cover about 0.06 acre and would be on existing Enbridge property. The fenced area would be expanded to include the new facilities at the Viking and Deer Park locations. All of the new facilities required for the Project at the Clearbrook Pump Station would be installed within the fenced area of the Clearbrook Terminal.

## **2.4.2 Typical Pipeline Construction Procedures**

The general construction sequence for the proposed pipeline is depicted in Figure 2.4.2-1 and described below. Construction activities would take place primarily during daylight hours. Where typical construction procedures are used to install the pipeline, the construction period would last approximately 2 to 3 months for each pipeline construction segment, extending from the initiation of clearing to the start of restoration. Additional information on the construction schedule is provided below and in Section 2.5.

During construction, all construction equipment, including vehicles and all-terrain vehicles (ATVs), would be required to remain within the approved construction right-of-way and extra workspace areas. In addition, construction equipment would be required to use temporary bridges across waterbodies, as required by Enbridge's state-specific EMPs (Appendix C).

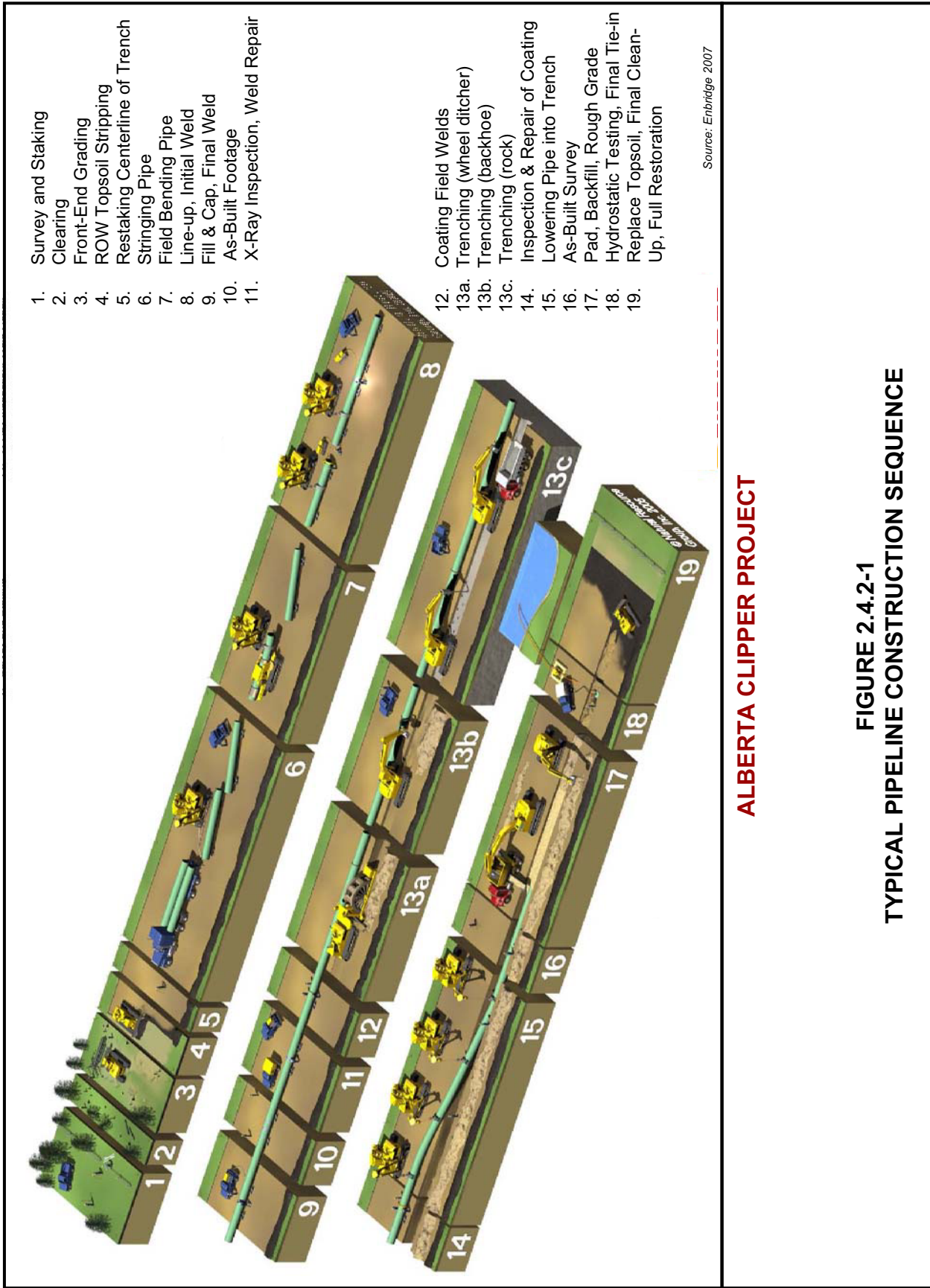
### **2.4.2.1 Survey and Staking**

#### **Construction Survey**

Before construction begins, Enbridge crews would survey and stake the centerline and exterior boundaries of the construction right-of-way. The exterior boundary stakes would mark the limit of approved disturbance areas that would be maintained throughout the construction period. As a part of this effort, Enbridge would contact the applicable state One-Call system to identify and mark the locations of underground utilities. Where the route would pass under high-voltage electrical transmission lines, Enbridge would contact the operator of the transmission line and coordinate construction to avoid interference between the transmission line and the construction activities.

#### **Noxious Plant Survey and Treatment**

During the pre-construction surveys, Enbridge also would identify and mark the locations of noxious and invasive species as a part of its program to minimize or prevent the introduction and spread of those species along the right-of-way. These surveys would be conducted in compliance with the procedures listed in Enbridge's state-specific Noxious Weeds and Invasive Species Control Plans (Noxious Weed Plans) (Appendix H) that were developed in accordance with Minnesota Regulations and Statutes and in coordination with the Minnesota Departments of Natural Resources and Agriculture, the FSA, NRCS, Forest Service, WDNR, FDL, and LLBO. As required by these plans, major infestation areas would be identified and treated with the recommended herbicides or their equivalents as agreed to by local agencies and by either LLBO or FDL where an infested area is on tribal land. FDL stated in a comment on the DEIS that it would require that herbicides not be used unless there is a compelling reason to do so, and such action would require written authorization for the location, herbicide, and application method.



## ALBERTA CLIPPER PROJECT

FIGURE 2.4.2-1  
TYPICAL PIPELINE CONSTRUCTION SEQUENCE

Construction equipment would be cleaned prior to arriving at the right-of-way. In addition, construction equipment used in infested areas would be cleaned before departing from the infested areas, including movement from an infested area to other portions of the construction right-of-way.

## **Anthrax Surveys and Treatments**

Anthrax is a naturally occurring disease that affects grazing animals and has been reported on about 260 farms in Minnesota. Anthrax spores are naturally occurring components of some soils, and disturbance of the soil can uncover spores that could be ingested by livestock. Enbridge has developed an Anthrax Mitigation Plan to address potential risks associated with excavations in areas known to have experienced outbreaks of anthrax (Appendix I). The plan identifies previously affected counties along the proposed pipeline route and mitigation measures that would minimize the potential for grazing animals in the vicinity of the proposed route to ingest anthrax spores.

Key procedures in the plan that Enbridge would be required to accomplish include contacting landowners along the proposed route prior to construction to identify properties that may have experienced an outbreak of anthrax, making arrangements to either prevent animals from grazing in the disturbed areas or to vaccinate the animals, implementing dust control measures, and identifying feedlot operators within 1 mile of the portions of the proposed route that have previously experienced anthrax outbreaks.

### **2.4.2.2 Clearing and Grading**

Enbridge would clear the construction right-of-way and temporary extra workspaces of shrubs and trees. Equipment used in areas with noxious plant species would be cleaned after work is completed in those areas. Before or during clearing activities, Enbridge would cut fences and livestock barriers as necessary to gain access to the right-of-way. Fences would be braced and secured prior to cutting, to avoid damage to the remaining portions of the fences; and temporary gates or fencing would be installed where necessary to contain livestock and maintain access restrictions. To prevent the passage of livestock, each fence line opening would be closed when construction crews are not in that work area. If gaps in natural barriers used for livestock control are created by pipeline construction, the gaps would be fenced according to the landowner's requirements.

We received a comment expressing concern about rock removal during construction. Stone and rock along the construction right-of-way would be removed in accordance with the procedures listed in Enbridge's state-specific EMPs (Appendix C). As required by the EMPs, Enbridge would attempt to remove excess stones and rocks larger than 4 inches in diameter from the upper 8 inches of soil, or as otherwise specified in permit conditions or landowner agreements. Excess rock would be piled in upland areas where landowner permission has been obtained or would be hauled offsite to an approved disposal site.<sup>4</sup>

The clearing crew typically would mow, chip, mulch, or haul off all non-merchantable timber. To facilitate proper cleanup and restoration in upland areas, tree stumps outside the ditchline would be ground to no less than 4 inches below the normal ground surface or removed and hauled to an approved disposal facility. As required by Enbridge's state-specific EMPs (Appendix C), no tree stumps would be left on the right-of-way unless requested by the landowner. Stumps along the trench line would be completely removed, ground, or hauled to an approved disposal facility. Disposal sites for stumps and

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<sup>4</sup> Approved disposal facilities are locations either licensed or permitted to receive waste materials. These include municipal or construction debris landfills or other upland locations with documented landowner approval that are in compliance with federal, state, and county laws and local ordinances for such use.

any other woody debris must be approved for use by the landowner and by Enbridge construction management. Woody debris would not be disposed of on agricultural areas or in wetlands.

All merchantable timber cut outside of reservation lands would be Enbridge property unless prior arrangements had been made with the landowner. Non-merchantable wood may be burned if Enbridge obtains the appropriate permits and approvals. Wood cut within the boundaries of the LLR would be provided to LLBO, and wood cut within the FDL Reservation would be provided to FDL.

After clearing, the ground surface would be graded where necessary to provide a relatively smooth working surface and a safe working area. A 20-foot-wide buffer strip would be left relatively undisturbed along the banks until just prior to installing the pipelines; grading would be accomplished immediately before the pipelines are installed across the waterbody.

Temporary bridges may be installed at sensitive waterbodies along the pipeline route to provide temporary access across the waterbody for equipment traveling along the construction right-of-way. The 20-foot-wide buffer area would not be maintained where the temporary bridges are installed. Bridges would not be used at drainage ditches, intermittent waterbodies, or other waterbodies without fisheries resources or other sensitive resources.

Temporary erosion control measures would be installed in accordance with the procedures presented in Enbridge's state-specific EMPs (Appendix C). This would include installation of devices that would slow surface runoff flows (slope breakers) and sediment barriers to prevent sediment from leaving the construction area.

#### **2.4.2.3 Topsoil Stripping**

Topsoil would be stripped and segregated in cropland, hayfields, pastures, government set-aside program areas, and other areas as requested by landowners along the construction right-of-way and in accordance with Enbridge's AMP (Appendix F). In active cropland, topsoil would be stripped from the areas to be used for storage of material excavated from the trench, from along the trenchline, and from along the primary travel lane. In other areas, surface soils would be stripped from directly over the trench, in accordance with the procedures described in Enbridge's state-specific EMPs (Appendix C) and its AMP (Appendix F).

To prevent the mixing of topsoil with less productive subsoil during construction, topsoil would be segregated in selected areas where soil productivity is an important consideration. The stockpiles of topsoil or other surficial soils would remain in place along each construction segment until the cleanup crew returns to backfill the trench and replace the segregated soils, approximately 2 to 3 months after being stockpiled.

#### **2.4.2.4 Pipe Stringing and Bending**

Prior to trench excavation, pipe would be placed (strung) along the construction right-of-way and arranged to be accessible to construction personnel. Specially designed stringing trucks would be used to deliver pipe from the pipe yards to the construction right-of-way. Small portable cranes or side-boom tractors would be used to unload pipe from the stringing trucks and place it along the right-of-way. A mechanical pipe-bending machine would bend individual joints of pipe to the angle required to traverse natural ground contours or to follow the pipeline alignment. In some areas, prefabricated fittings would be used where field bending is not practical.

#### 2.4.2.5 Welding and Coating

After stringing and bending are complete, pipe sections would be aligned, welded together, and placed on temporary supports along the edge of the area to be trenched. The welds would be inspected visually and by using radiographic techniques. The pipe would be coated at the factory with fusion-bonded epoxy or a similar material to prevent corrosion; Enbridge would apply a similar coating to welded joints and electronically inspect the pipeline coating before the pipe is lowered into the trench.

#### 2.4.2.6 Trenching

Trenching typically would begin after the pipe has been welded and placed near the trench line. Backhoes or ditching machines would be used to excavate the trenches and place the excavated materials in stockpiles adjacent to the trench, as depicted in Figures 2.4.1-1 and 2.4.1-3. Areas where drain tiles are cut during trenching would be flagged.

Portions of the proposed route extend through areas where petroleum spills have occurred in the past. If petroleum-contaminated soil is encountered during excavation (or during topsoil stripping), Enbridge would follow the procedures presented in its Petroleum-Contaminated Soil Management Plan (Appendix J). The plan also lists the locations of petroleum releases that have occurred along the proposed route. If petroleum-contaminated soil is encountered during either topsoil stripping or trenching, the soil would be segregated and contained to avoid spreading the contamination. Such soils would not be used for backfilling unless approved by Enbridge in consultation with the relevant agencies. Stockpiled petroleum-contaminated soil would either be treated at an off-site facility in accordance with regulations or transported to a regulated landfill for disposal.

Current DOT regulations (49 CFR 195.248, July 1998) list the required minimum burial depth (depth from soil surface to the top of the pipe). The minimum required depths listed and relevant to the proposed Project are presented in Table 2.4.2-1; Enbridge would be required to bury the pipeline to at least these depths.

<b>TABLE 2.4.2-1</b>		
<b>DOT-Required Minimum Burial Depths of Crude Oil Pipelines</b>		
<b>Location Type</b>	<b>Cover in inches</b>	
	<b>Normal Excavations</b>	<b>Rock Excavations<sup>a</sup></b>
Industrial, commercial, and residential areas	36	30
Crossing of inland waterbodies ≤ 100 feet wide	48	18
Drainage ditches at public roads and railroads	36	36
Any other area	30	18

<sup>a</sup> Rock excavation is defined by the U.S. Department of Transportation as any excavation that requires blasting or removal by equivalent means.

However, Enbridge plans to provide at least 36 inches of cover along most of the alignment and would bury the pipe deeper in many locations as part of agricultural mitigation agreed to with the states, tribes, and landowners. In North Dakota, Enbridge agreed to a minimum ground cover depth of from 36 to 48 inches. In both Minnesota and Wisconsin, Enbridge plans to provide a minimum pipe cover of 36 to 54 inches. Table 2.4.2-2 lists the proposed depths of coverage by land type within each state.



<b>TABLE 2.4.2-2 Proposed Depth of Cover to Top of Pipe for the Alberta Clipper Pipeline</b>			
<b>Land Type Crossed</b>	<b>Planned Depth of Cover (inches)</b>		
	<b>North Dakota</b>	<b>Minnesota</b>	<b>Wisconsin</b>
Cultivated land (crop)	48	54 <sup>a</sup>	36
Rangeland (pasture)	48	36	36
Industrial, commercial, and residential	36	36	36

<sup>a</sup> Depth would be 36 inches if a waiver is obtained from the landowner.

To achieve the desired burial depths for the pipe, the trench typically would be approximately 4 feet wide at the base and up to about 17 feet wide at the top, with walls sloped to maintain stability according to soil types and other site-specific conditions. In unstable and saturated soils, the trench may be wider.

Enbridge has proposed a lay rate for the pipeline that would range from about 3,000 to about 7,500 feet per day, dependent on conditions along the alignment. No more than 14,000 feet of the alignment would be open trench at any one time on each pipeline construction spread. That distance is the equivalent of approximately 2 days of pipeline welding. As a result, the trench typically would be open no more than 2 days at a specific location, weather permitting.

In a comment on the DEIS, WDNR asked if the excavations could be smaller in clay soils. Enbridge responded that it would consult with WDNR to determine whether narrower excavations can be accomplished within the clay soils in Douglas County. The consultation would include consideration of OSHA-compliant excavations for Class B soils, existing pipeline integrity, and the need for adequate room to ensure proper segregation of topsoil and subsoil.

When trench dewatering is necessary, water would be discharged directly to the ground where there is adequate vegetation along the right-of-way to effectively filter the water. If the vegetation is sparse or absent, or in environmentally sensitive areas (such as adjacent to waterbodies or wetlands), straw bale dewatering structures or suitable filtering alternatives would be used to minimize siltation in the waterbodies. Those procedures are described further in Enbridge's state-specific EMPs (Appendix C).

We received a comment expressing concern about trench water discharge and filtering methods. Enbridge would conduct those activities in accordance with the requirements of its state-specific EMPs (Appendix C). As required by the EMPs, discharges of trench water would be directed through either a straw bale dewatering structure or a geotextile filter bag located in a well vegetated upland area. The size of straw bales used would be dependent on the maximum discharge rate, and the geotextile filter bags would be sized appropriately for the discharge flow and suspended sediment particle size.

#### **2.4.2.7 Lowering-In and Backfilling**

After welding, coating, and trench excavation are completed, the pipe would be lowered into the trench by side-boom tractors. In sloped areas, trench breakers would be installed as needed to avoid subsurface water flow and erosion along the trench line. Trench breakers would consist of burlap sandbags filled with rock-free subsoil or sand and placed from the bottom of the trench to near the top, surrounding the pipe. Trench breakers would be installed in accordance with the requirements of Enbridge's state-specific EMPs (Appendix C); the locations for trench breakers would depend on conditions such as the degree and length of the slope, the presence of sensitive resource areas downslope, and proximity to other features

such as roads or railroads. The spacing of trench breakers would be as follows, unless otherwise dictated by site conditions:

- 250 feet apart where the slope is 3 to 5 percent;
- 200 feet apart where the slope is approximately 5 to 15 percent;
- 150 feet apart where the slope is approximately 15 to 25 percent; and
- Less than 100 feet apart where the slope is greater than 25 percent.

Trench breakers would also be installed on slopes greater than 5 percent where the slope is adjacent to a waterbody or wetland and at the edges of wetlands and/or waterbodies where there is a potential for underground drainage along the pipe due to lower topographic relief adjacent to the feature. Selection of the locations of the trench breakers would be made by Enbridge's Environmental Inspectors (see Section 2.7) in concert with the contractor's foreman for backfilling activities.

Bladed equipment or a specially designed backfilling machine would be used to backfill the trench with the material excavated from the trench. In areas where the topsoil is segregated, the subsoil would be replaced first and the topsoil spread uniformly on top. The trench would be backfilled to the approximate ground surface elevation, except that an excess of soil or "crown" would be placed directly above the pipeline in most areas to allow for future settling. Enbridge would not leave a crown over the backfill area in swales, where drain tiles are present, or in wetlands (except where winter construction is conducted in wetland areas, as described in Section 2.4.3). Neither construction debris nor refuse would be added to the backfill material. In places where a large amount of rock is present in the excavated material, the pipeline would be protected with rock shielding or a similar protective coating or backfilled with clean padding prior to backfilling.

#### **2.4.2.8 Pipeline Testing**

After backfilling, Enbridge would conduct two types of testing to ensure the integrity of the pipeline. First, the pipeline would be hydrostatically tested in accordance with PHMSA regulations to ensure that the system would be capable of operating at the design pressure. The testing process would involve filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.

For each pipe section to be hydrostatically tested, Enbridge would excavate around each end of the section and install a manifold to the end of the pipe. The manifolds would include valves to allow for the filling and draining of the test section and the release of displaced air, and to connect to testing equipment that would be used to measure and record the pressure within the test section. Once the hydrostatic testing is completed, the manifolds would be removed and the separate pipeline test sections would be welded together. The excavations at the ends of the test sections would remain open only during testing and would be backfilled when the test is completed.

The length of open trench required to install the manifolds is dependent on site-specific conditions but is typically less than 200 feet. To meet applicable safety standards for workers in the excavation, the excavation would be slightly wider than the excavation width required to install the pipe. Temporary erosion and sediment control structures at the excavation sites would be installed and maintained in accordance with Enbridge's state-specific EMPs (Appendix C). Dewatering of the open trench, if necessary, would also be completed in accordance with the EMPs. Restoration of the sites after removal of the manifolds and backfilling would be accomplished in accordance with Enbridge's EMPs and state-specific Revegetation and Restoration Monitoring Plans (Appendix K).

The length of individual test segments would be determined by topography and water availability. Water withdrawals would be consistent with applicable regulations and Enbridge's state-specific EMPs (Appendix C); they would be obtained from major waterbodies crossed by the pipeline or municipal or private sources along the pipeline route. Enbridge would not add biocides or other chemicals to the test water. Test water would be discharged to the waterbody it was obtained from either directly with use of an energy dissipation device at the waterbody or through an energy dissipation device to ground surface that would allow the water to flow into the waterbody. Test water would be discharged in accordance with Enbridge's state-specific EMPs (Appendix C) and permits issued by federal, state, tribal, or local agencies. All landowners within 200 feet of each hydrostatic test area would be notified of the planned test and advised to stay a safe distance from the pipeline being tested.

After completion of hydrostatic testing, Enbridge would conduct an internal inspection of the pipeline using an electronic inspection tool (caliper pig). The caliper pig would travel inside the pipe, and its on-board computers would mechanically, ultrasonically, or magnetically examine the condition of the pipe. This technique would identify potential problems such as dents, gouges, or cracks. The results of the inspection would be analyzed; if potential problems are identified, that section of pipe would be repaired or replaced.

#### **2.4.2.9 Cleanup**

Enbridge intends to initiate cleanup, rough grading, and installation of temporary erosion control measures within 72 hours of completion of backfilling. After the trench is backfilled, Enbridge would regrade and restore work areas as nearly as practical to the original contour of the land. Topsoil would be redistributed over areas from which it was originally removed. Fences that had been removed to install the pipeline would be reconstructed across the right-of-way. Enbridge intends to complete cleanup within 1 week of backfilling, weather permitting. In areas where both the Alberta Clipper and Diluent Project pipelines are installed, cleanup would be initiated after the second pipeline trench is backfilled.

#### **2.4.2.10 Restoration and Revegetation**

Disturbed areas would be revegetated in accordance with the Enbridge AMP (Appendix F), Enbridge state-specific EMPs (Appendix C) and Revegetation and Restoration Monitoring Plans (Appendix K), other permit requirements, and site-specific agreements with landowners. At each construction area, the time between the start of clearing activities and the start of restoration activities would be approximately 2 to 3 months.

Cultivated fields and compacted or rutted areas would be tilled with a deep-tillage device or a chisel plow to loosen compacted soils. After tilling, the bulk density of the soil would be measured using a soil penetrometer. If additional measures are incorporated to alleviate soil compaction, Enbridge would follow the procedures included in its AMP (Appendix F).

The timing of revegetation would depend on conditions at the construction site. As specified in the revegetation and restoration monitoring plans, temporary revegetation would be established in construction work areas where 14 days or more will elapse between (1) the installation of the first pipeline and the second line where the Alberta Clipper and Diluent Project pipelines would be co-constructed; and (2) the completion of final grading at a site and the establishment of permanent vegetation, or where there is a high risk of erosion due to site-specific soil conditions and topography. Temporary seeding may be accomplished sooner than 14 days at locations near sensitive resource areas and areas prone to wind and water erosion.

Mulch and seed used for revegetation would be certified to be free of seeds of noxious and invasive plant species as specified in Enbridge's state-specific Revegetation and Restoration Monitoring Plans (Appendix K). Final seeding operations would be completed within 24 hours of final grading, weather permitting. Permanent revegetation would be established using seed mixes that would include native seed varieties commonly occurring in the area.

If property improvements that were present prior to initiation of construction (such as fences, gates, irrigation ditches, cattle guards, and reservoirs) are damaged, they would be repaired to pre-construction conditions or better.

### **2.4.3 Special Pipeline Construction Procedures**

Enbridge would use special construction techniques where warranted by site-specific conditions. These special techniques are described in the following sections:

- Wetland Crossings (Section 2.4.3.1);
- Waterbody Crossings (Section 2.4.3.2);
- Construction in Steep Terrain (Section 2.4.3.3);
- Road, Highway, and Railroad Crossings (Section 2.4.3.4);
- Construction near Residences (Section 2.4.3.5); and
- Blasting (Section 2.4.3.6).

#### **2.4.3.1 Wetland Crossings**

Along most of the pipeline route, construction in wetlands would generally be similar to construction in uplands and would consist of clearing, trenching, dewatering, installation, backfilling, cleanup, and revegetation. In some wetland areas, Enbridge has proposed to install the pipeline during winter; in other areas, the unstable nature of the wetland soils would require construction activities that differ from standard upland procedures. Where a wetland cannot support construction equipment, construction activities would be accomplished from timber construction mats or by using low ground-pressure equipment. Typical construction schematics illustrating wetland crossings are provided in the state-specific EMPs in Appendix C. Enbridge has initiated coordination with the COE, MPCA, MDNR, and WDNR to identify the least environmentally damaging practicable alternative (LEDPA) for crossing wetlands and will continue this coordination until there is final agreement regarding the appropriate method for each wetland crossing. Final wetland crossing methods for each wetland would be determined as part of that coordination. Information on Enbridge's proposed wetland construction techniques is presented below, including the following:

- Clearing and grading;
- Trenching and installation;
- Cleanup and revegetation; and
- Winter construction of wetland crossings.

#### **Clearing and Grading**

Vegetation within wetlands would be cut off at ground level; root systems would be left intact. Stumps would be removed above the trench line where necessary for safe operation of equipment and for access

along the construction right-of-way. Trees, shrubs, and stumps that are removed would be properly disposed of outside of the wetland. Timber construction mats, if needed, and temporary erosion control measures would be installed during this phase of construction.

### **Trenching and Installation**

In wetlands, the pipeline trench typically would be excavated using a backhoe excavator. In unsaturated wetlands, up to 1 foot of topsoil would be stripped from the trench line and stockpiled separately from materials excavated from the trench. As presented in Enbridge's state-specific EMPs (Appendix C), the segregated topsoil layer would typically be stockpiled in a linear pile, adjacent to the excavated trench and within the construction workspace. The storage location may be adjusted within the construction workspace if required by site-specific conditions. Subsurface material excavated from the trench would be separately stockpiled adjacent to the trench.

It may not be feasible to use the typical upland construction methods described above for crossing large wetlands with standing water and saturated soils. In those types of wetlands, the trench would be excavated by a backhoe supported on timber mats; however, with this method, it is often not feasible to separate topsoil from the underlying soil.

If the soils in the wetland area are stable and capable of supporting equipment with or without timber construction mats, the pipe would be strung, welded, and lowered into the trench as described for upland areas. When water is present in the trench during the lowering-in process, the trench may be temporarily dewatered or the pipe flooded to sink it into the trench.

For crossing large wetlands with standing water and saturated soils, pipe would be assembled in an upland area and floated across the wetland in the excavated trench using a push-pull technique or by adding floats to the pipe. When the pipeline is in position, the floats, if used, would be removed and the pipeline sunk into position and welded to the adjacent upland segments of the pipeline.

After the pipe is installed, the trench would be backfilled. In areas where the topsoil has been segregated, topsoil would be replaced after backfilling and the original contours would be restored to the extent practical. As discussed in Enbridge's state-specific EMPs (Appendix C), if the volume of subsoil exceeds the elevation of the ground adjacent to the trench during backfilling, any additional subsoil would be removed from the wetland and disposed of in an upland area or approved disposal site, in accordance with applicable regulations. Typically, upland disposal would consist of spreading the material on the ground within the upland portion of the construction workspace where topsoil has been segregated. If alternate upland disposal locations are identified, Enbridge would complete applicable environmental surveys of, and permit applications for use of, the proposed areas prior to use.

### **Cleanup and Revegetation**

Cleanup and rough grading would begin as soon as practical after the trench is backfilled. Timber mats, if used, would be removed during the cleanup operations. Disturbed wetland areas would be revegetated with annual rye or a similar annual cover species in accordance with the recommendations of NRCS (unless standing water is prevalent) or as otherwise directed by landowners or regulatory agencies. No fertilizer, lime, or mulch would be applied in wetlands.

## **Winter Construction of Wetland Crossings**

### ***Wetland Areas Selected for Winter Construction***

Enbridge reviewed existing field conditions, publicly available soils information, and information from contractors experienced in constructing pipelines across this region of the state to develop the proposed construction techniques and to identify portions of the route where winter construction would be appropriate. As a result of these considerations, Enbridge identified two areas along the proposed route where there are large, saturated wetlands with unconsolidated soils. In these types of areas, construction of large-diameter pipelines is often difficult and has the potential for greater impacts than in other wetland areas due to the wider trench widths required and the greater amount of surface disturbances.

The two wetland areas where construction would occur during winter consist of about 7 miles along the route in the vicinity of the Deer River Pump Station (between MP 996.0 and MP 1003.0); and about 18 miles along the route in the vicinity of the Floodwood Pump Station (between MP 1028.0 and MP 1045.6). Winter construction would include installation of both the Alberta Clipper and the Diluent Project pipelines during the same construction period. The total distance of winter construction would be approximately 25 miles.

Enbridge's assessment indicated that winter construction in these two areas would be appropriate because the use of typical wetland construction procedures during other seasons would be more difficult to accomplish and would result in greater environmental impacts. The majority of the wetlands along the two winter construction areas are saturated, and soils beneath the surface have little or no shear strength; without using winter construction methods, the heavy equipment needed for pipeline installation could cause extensive damage to the wetland or in many areas would not be able to effectively access the trench line. For the selected segments, winter construction would result in less overall disturbance of soil and vegetation than summer construction; specifically, summer construction in unstable soils would result in increased sloughing of trench walls and wider trenches, and would cause significantly more soil disturbance than excavation under frozen conditions. In addition, summer construction would necessitate the creation or expansion of many access roads; those roads would not be needed for winter construction.

Enbridge prepared a Winter Construction Plan for those two areas for construction of both the Alberta Clipper and Diluent Projects. The Winter Construction Plan is provided in Appendix O and includes illustrations of the planned construction methods along the right-of-way. Winter construction would also comply with the applicable requirements of Enbridge's state-specific Revegetation and Restoration Monitoring Plans (Appendix K) and Noxious Weed Plans (Appendix H).

### ***Construction Right-of-Way***

The winter construction right-of-way through the wetland areas would be 140 feet wide, and the permanent right-of-way would be 105 feet wide. The winter construction right-of-way is greater than that for standard wetland construction methods during non-winter periods due to the extensive size of the wetlands and wetland complexes that cannot be avoided, because they are dominated by flooded to persistently saturated conditions, and because their deep-to-shallow, well-decomposed peat soils are underlain by sands or wet mineral soils with non-cohesive sands. The proposed increase in pipe spacing and associated workspaces for these wetlands would be needed to provide safe spacing between the existing pipelines as well as between each of the new pipelines.

The spacing has not been proposed based on the season of construction and would be used for up to 35 miles of saturated wetlands during summer due to the risk of soil subsidence that could move or stress the existing adjacent pipelines. Winter construction is not proposed for these areas, although also

saturated, as Enbridge believes that their soils can accommodate heavier loads and installation in non-frozen conditions. Further, the amount of wetlands proposed for winter construction is limited by contractor availability, the length of the winter construction season, productivity of winter work, and timing restrictions associated with bald eagle nesting periods. With this proposed spacing, Enbridge would accomplish the following:

- Maintain a 40-foot distance between the existing outermost pipeline and the Diluent Project pipeline;
- Maintain a 40-foot distance between the Diluent Project pipeline and the Alberta Clipper pipeline; and
- Maintain a 60-foot distance between the Alberta Clipper pipeline and the outer edge of the construction right-of-way.

### ***Construction Techniques***

Winter construction would begin with clearing and establishment of two frost (ice) roads over ground that is essentially impassible outside of winter months (Appendix O). This work would begin as soon as weather conditions permit. The ice roads, which would be made from compacted snow and ice, would provide a stable winter working platform for working equipment, pipe fabrication, lowering-in activities, and travel along the right-of-way. One frost road would be established on the working side of the Diluent Project pipeline, the other on the working side of the Alberta Clipper pipeline.

Since there is likely to be little woody vegetation in the saturated wetlands, clearing would essentially be completed as part of the frost road construction. However, in areas where salvage of timber is required by logging, the frost roads would be constructed to the edge of the existing timber line. The timber could then be salvaged, and an additional portion of the road could be constructed on the newly cleared area.

Ice roads would be constructed using lightweight equipment, such as snowmobiles, to push and pack snow along the designated path as soon as there is sufficient frost or snow to support the equipment. If there is not sufficient snowfall during the winter season to construct the roads from snow on the ground, Enbridge may haul snow to the road construction areas or use snow from snow-making equipment. While the roads are under construction, snow would be mounded over the ditch lines to create an insulation blanket (termed a “snow roach”). This would serve as insulation and would result in easier excavation of the underlying material. The snow roach would be removed just prior to trenching.

As the frost roads begin to freeze, progressively larger and heavier equipment would be used to drive the frost deeper into the subsurface material of the wetland, and water trucks may be used to spray the roads to build up the frozen layer. Road construction would be conducted 24 hours per day, with much of the work conducted at night when temperatures are the lowest. A minimum of 30 inches of frost and/or ice would be needed to support the equipment used for pipeline installation.

After the roads are established, pipe for the Diluent Project would be strung using specialized stringing equipment designed to minimize ground pressure, then assembled using conventional pipeline assembly techniques. The trench would be excavated using methods similar to those for typical summer saturated wetland construction (described above). Enbridge would attempt to segregate the top frozen layer of wetland soil (topsoil) during excavation. However, subsurface materials are expected to be unconsolidated and would not likely “stack” well when sidecast along the trench. To the extent practical, the segregated topsoil layer would be kept separate from lower, less cohesive subsoil material.

When excavation is complete, the assembled pipeline sections would be lowered into the trench, then excavated subsoil material would be used to backfill the trench, and the segregated topsoil layer would be replaced over the trenchline. After backfilling, Enbridge would restore the original conditions of the wetlands to the extent practical, except in areas where a crown would be left over the trench to account for settling of frozen backfill; in those areas, Enbridge would restore the original conditions, to the extent practical, during the following spring or summer.

After the initial construction activities for the Diluent Project pipeline are completed, work would begin on the Alberta Clipper pipeline using the same winter construction techniques. Enbridge would control the progress of installation to minimize the distance between front-end activities of the first construction team and back-end activities (backfill and restoration) of the second team. Resources of the two crews would be monitored and reallocated as necessary to complete installation of both lines as quickly as possible.

### ***Challenges of Winter Construction***

In its comments on the DEIS, WDNR requested that the EIS describe problems that winter construction may present in saturated wetlands. In response, Enbridge indicated that the winter construction process does introduce some unique challenges, particularly soil handling. During trenching, topsoil tends to be removed as slabs of frozen soil that extend to the frost depth. Depending on the depth of freezing, some subsoil may be removed with the frozen topsoil block; however, Enbridge proposes to minimize the amount of frost formed over the proposed trench lines by leaving an insulating mound of snow (snow roach) over the trench centerlines during the formation of the frost roads.

During trenching, the excavated material may also freeze once it has been placed next to the excavated trench. Backfilling with frozen material can result in voids in the backfill material that could persist until the summer. At that time, thawing would likely result in subsidence, leaving depressions along the centerline of the alignment. To minimize the potential for this to occur, Enbridge would limit the amount of open trench during winter construction to no more than about 14,000 feet in each work area. This would limit the time that excavated material would be exposed to aboveground temperatures. If some excavated material does freeze, Enbridge would break large frozen blocks of material into smaller pieces during backfilling to limit the size of voids created by ice and frozen materials.

### ***Cleanup and Restoration***

Temporary sediment barriers would be installed after final grading and cleanup unless snow melt and runoff are likely to occur during construction. If final grading and/or cleanup can not be completed until the following spring, temporary slope breakers and sediment barriers would be installed during rough grading in compliance with the requirements of Enbridge's state-specific EMPs (Appendix C) and applicable permits.

Permanent revegetation would be completed in accordance with Enbridge's state-specific Revegetation and Restoration Monitoring Plans (Appendix K) and applicable permit conditions. As stated in those plans, Enbridge would not apply mulch in wetlands and would not seed saturated, standing-water wetland areas; reestablishment of vegetation in those areas would be allowed to occur through natural processes without supplemental seeding. Non-saturated wetlands affected by winter construction would be seeded the following spring/summer during the recommended seeding periods.



### **2.4.3.2 Waterbody Crossings**

The proposed route would cross perennial, intermittent, and seasonal waterbodies, and non-jurisdictional ditches and drains. Enbridge proposes to cross most waterbodies, including designated coldwater fisheries waterbodies using a dry crossing method (dam-and-pump, flume, or HDD) where feasible. If streamflow cannot be appropriately managed due to high flow conditions at the time construction is planned for a specific crossing, Enbridge would delay construction of the crossing until the flow subsides to more manageable volumes. The crossing method proposed for each waterbody along the route is identified in Appendix P.

Enbridge has initiated coordination with the COE, MDNR, MPCA, and WDNR to identify the LEDPA for crossing waterbodies and will continue this coordination until there is final agreement regarding the appropriate method for each waterbody crossing. Information on Enbridge's proposed waterbody construction techniques that would be used is presented below in the following categories:

- Clearing and grading;
- Temporary equipment bridges;
- Trenching and installation; and
- Restoration and revegetation.

#### **Clearing and Grading**

Enbridge would clear existing vegetation from the construction right-of-way as necessary to prepare for grading operations. A 20-foot-wide buffer of non-woody and woody vegetation less than 4 inches in diameter at breast height would be maintained on the banks of waterbodies until trenching begins at the crossing. Woody vegetation within this buffer may be cut manually and removed during initial clearing of the right-of-way. In addition, grading may be necessary on the banks of some waterbodies to install temporary bridges across the waterbodies (described below). It also may be necessary to grade approaches to waterbodies in order to create safe working surfaces and to allow for limitations on pipe bending.

Grading would be directed away from the waterbody to reduce the potential for material to enter the waterbody. Temporary erosion control measures (such as silt fences and straw bales) would be installed as necessary to minimize the potential for disturbed soils to enter the waterbody from the right-of-way. Extra workspaces at waterbody crossings typically would be set back 50 feet from the water's edge where topographic and other site conditions allow (see Appendix N).

#### **Temporary Equipment Bridges**

To allow vehicles and equipment to travel along the construction right-of-way, temporary bridges would be installed across most waterbodies. Exceptions would include waterbodies that are too wide to bridge and minor waterbodies that are not state-designated fishery habitats, such as agricultural and intermittent drainage ditches. Bridge design would be (1) clean rock placed over flume pipes; (2) prefabricated construction mats placed over the waterbody, with or without a culvert; or (3) flexi-float or other temporary bridging. In a comment on the DEIS, MDNR stated that it recommends the use of span-type bridging, such as railroad flat cars. The equipment bridges would be designed to accommodate the maximum foreseeable streamflow and maintained to prevent flow restrictions while in place.

The bridges generally would be installed during the clearing and grading phase of construction. They would be constructed in a manner that would minimize streambed and bank disturbances. Bridges would

be cleaned as necessary to minimize soil that falls off of equipment using the bridge from entering the waterbody.

Construction equipment, with the exception of clearing and bridge installation equipment, would be required to use the bridges to cross over waterbodies; the clearing equipment typically would need to cross the waterbodies prior to bridge installation. Bridges would be removed during final cleanup of the right-of-way.

## **Trenching and Installation**

After the initial clearing and grading is completed, the pipeline would be installed across the waterbodies using one of six methods: dry crossing methods (dam-and-pump or flume), open cut, open cut/push-pull, push-pull, road bore, or HDD. These methods are summarized below and are further described and depicted in the state-specific EMPs provided in Appendix C.

### ***Open-Cut Method***

The open-cut method (also known as the “wet trench” method) is a waterbody crossing technique that often minimizes total duration of instream disturbance; it would be used to cross small streams and drainages and when trenching wetlands (wetland crossing methods are discussed further in Section 2.4.3.1).

With the open-cut method, the trench would be excavated using draglines or backhoes operating from the streambanks. Enbridge would place excavated material on the upland right-of-way at least 10 feet from the water’s edge or in the extra workspaces. The extra workspaces would be set back 50 feet from the water’s edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody.

During excavation of the instream trench, earthen “trench plugs” (similar to the trench plugs described in Section 2.4.2.7) would be left at each end of the excavation to prevent the surface water from entering the adjacent excavated pipeline trench. When excavation of the trench is complete, the trench plugs would be removed and a prefabricated section of pipe would be positioned and lowered into the trench.

On selected waterbodies, the open-cut method would be modified to an open-cut/push-pull method. The trench would be excavated using the same techniques as the standard open-cut method, but the pipe segment would be welded together from the streambank. It would be equipped with buoys, and it would be pushed or pulled across the water-filled trench. After the pipeline is floated into place, the floats would be removed and the pipeline would sink into the trench. Waterbodies with associated wetlands also would be crossed using similar push-pull methods, as described in Section 2.4.3.1.

Using standard open-cut methods or open-cut/push-pull methods, the trench would be backfilled with the excavated material, unless otherwise specified in stream crossing permits, and the ends of the pipe in the crossing would be connected to the adjacent pipeline segments.

Enbridge would attempt to complete instream crossings within 24 hours of initiation at minor waterbodies (less than 10 feet wide) and within 48 hours of initiation for waterbodies more than 10 to 99 feet wide. Site-specific crossing conditions, permit requirements, or weather conditions may extend the crossing time.

Enbridge proposes to modify the proposed crossing method based on flow conditions at the time of construction. Enbridge proposes to use the open-cut method on waterbodies planned as a dry crossing, if the waterbody is dry or has no perceptible flow at the time of construction. Alternatively, Enbridge proposes to use a dry crossing method for waterbodies that were proposed as an open cut but had perceptible flow at the time of construction. According to Enbridge, the appropriate regulatory agencies will be contacted to discuss the change in crossing methods.

### ***Dry Crossing Methods***

#### **Dam-and-Pump Method**

The dam-and-pump method is a dry crossing method used for sensitive waterbodies with low gradients and flow, or sensitive waterbodies with meandering channels. This method involves constructing temporary dams across the waterbody, both upstream and downstream of the crossing, prior to excavation. Dams generally would be installed using sandbags, plastic sheeting, or steel bulkheads. Pumps and piping would be used to transport the streamflow around the construction area.

When using this method, Enbridge would begin pumping while the dams are being installed to prevent interruption of streamflows. Where necessary to prevent scouring of the waterbody bed or adjacent banks, the downstream discharge would be directed into an energy-dissipation device or concrete weight. The pump capacity would be greater than the anticipated flow of the waterbody being crossed, and pumping operations would be staffed and monitored. Flow rates would be adjusted to maintain the flow of water downstream and prevent excessive drawdown of the waterbody upstream of the construction area. A backup pump (or pumps) would be onsite in the event of failure of the primary pump (or pumps).

When streamflow is routed around the construction area, water from the area between the dams would be pumped into a straw bale structure or similar dewatering device. These devices would be located in well-vegetated upland areas, if present, and would be designed in a manner to prevent the flow of heavily silt-laden water into waterbodies or wetlands. Backhoes would excavate the trench from one or both banks or from within the isolated waterbody bed. Excavated material would be stockpiled on the construction right-of-way at least 20 feet from the water's edge or in the extra workspaces. The extra workspaces would be at least 50 feet from the water's edge except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody.

After the trench is excavated to the proper depth, a prefabricated section of pipe would be positioned and lowered into it. The trench then would be backfilled with the material excavated from the bed of the waterbody, unless otherwise specified in stream crossing permits. Prior to removing the dams and restoring streamflow, water that accumulated in the construction area would be pumped into a straw bale structure or similar dewatering device, and the bottom contours of the streambed and the streambanks would be restored as closely as practical to pre-construction contours.

Enbridge would attempt to complete instream crossings within 24 hours of initiation at minor waterbodies (less than 10 feet wide) and within 48 hours of initiation for waterbodies more than 10 to 99 feet wide. Site-specific crossing conditions, permit requirements, or weather conditions may extend the crossing time.

## **Flume Method**

The flume method is a dry crossing method used for sensitive, relatively narrow waterbodies free of large rocks and bedrock at the trenchline and with a relatively straight channel across the construction right-of-way. The flume method generally is not appropriate for wide, deep, or heavily flowing waterbodies. Use of this method involves installing dams upstream and downstream of the construction area and installing one or more pipes (flumes) that would extend along the course of the waterbody and through both dams. Streamflow would be carried through the construction area by the flume pipe(s).

Enbridge would install flumes with sufficient capacity to transport the maximum flows that could be generated seasonally within the waterbody. The flumes, typically 40 to 60 feet long, would be installed before trenching and aligned to prevent impounding of water upstream of the construction area or to cause back-erosion downstream.

The upstream and downstream ends of the flumes would be incorporated into dams made of sandbags and plastic sheeting (or equivalent material). Upstream dams would be installed first and would funnel streamflow into the flumes. Downstream dams then would be constructed to prevent water from flowing back into the area to be trenched. Enbridge would monitor the dams and adjust them as necessary to minimize leakage. The flumes would remain in place during pipeline installation, backfilling, and streambank restoration.

Prior to trenching, the area between the dams typically would be dewatered. Backhoes working from one or both banks, or from within the isolated waterbody bed, would excavate the trench across the waterbody and under the flume pipes. Excavated material would be stockpiled on the upland construction right-of-way at least 10 feet from the water's edge or in the extra workspaces. The extra workspaces would be at least 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Sediment containment devices, such as silt fences and straw bales, would be installed to contain the excavated material and to minimize the potential for sediment to migrate into the waterbody.

After the trench is excavated to the proper depth, a prefabricated section of pipe would be positioned and lowered into the trench. The trench then would be backfilled with the excavated material from the stream unless otherwise specified in stream crossing permits. Prior to removing the dams and flume pipes and restoring streamflow, water that accumulated in the construction area would be pumped into a straw bale structure or similar dewatering device, and the bottom contours of the streambed and the streambanks would be restored as close as practical to pre-construction contours.

Enbridge would attempt to complete instream crossings within 24 hours of initiation at minor waterbodies (less than 10 feet wide) and within 48 hours of initiation for waterbodies more than 10 to 99 feet wide. Site-specific crossing conditions, permit requirements, or weather conditions may extend the crossing time.

## ***Horizontal Directional Drilling Method***

The HDD method involves drilling under the waterbody and installing the pipeline without physical disturbance of the bed of the waterbody or the streambanks. This method would be used to cross environmentally sensitive areas such as impaired waters, sensitive fishery resources, and riparian forested wetlands. The feasibility of using HDD is dependent on subsurface substrate conditions and the length of the drill path. Portions of the proposed pipeline route would cross regions with soils that are not conducive to HDD technology, including soils containing cobbles, boulders, layers of gravel, or non-cohesive sands. To determine whether HDD crossings would be possible at the waterbodies identified as

potential HDD crossings, Enbridge conducted geotechnical investigations. Based on those studies, Enbridge proposes to use the HDD method to cross the waterbodies listed below:

- Pembina River (MP 775.5);
- Tongue River (MP 786.1);
- Red River (MP 801.7);
- Judicial Ditch No. 3/10 (MP 817.0);
- Tamarac River (MP 828.7);
- Middle River (MP 835.9);
- Snake River (MP 843.2);
- Red Lake River (MP 864.3);
- Clearwater River (MP 875.4, plus railroad and U.S. Route 59);
- West Four Legged Lake (MP 916.6);
- Mississippi River (MP 939.7);
- Pike Bay Channel (MP 955.8);
- Mississippi River (three channels starting at MP 986.0);
- Ball Club River Secondary Channel (MP 989.4) and River Crossing (MP 989.5);
- Deer River (plus three ditches starting MP 995.3); and
- Prairie River (MP 1010).

If unusually high flow rates occur at the planned time of construction of other stream crossings, and if the flow does not subside enough to allow use of the planned stream crossing method within a reasonable period of time, Enbridge may consider use of the HDD method at those crossings to avoid a substantial delay of the construction schedule.

HDD crossings would be accomplished in accordance with Enbridge's state-specific EMPs (Appendix C). Work on HDD crossings would include some work during nighttime hours. Use of the HDD method would require extra workspaces on both sides of the crossing to accommodate equipment and materials associated with the drilling operation and to fabricate the pipeline segment that would be installed under the waterbody. As noted in Table 2.4.1-1 and illustrated in Appendix N, each HDD crossing would require an extra workspace area of approximately 200 by 75 feet on each side of the crossing. After setting a drill rig in place in the extra workspace area on one side of the waterbody, pipeline installation would be accomplished in three general stages:

- Drill a small-diameter pilot hole along a pre-determined path under the waterbody;
- Incrementally enlarge or ream-out the pilot hole to a diameter that would accommodate the pipeline; and
- Pull a prefabricated segment of pipe through the enlarged hole and weld it to the adjoining sections of pipe.

Throughout the process of drilling and enlarging the pilot hole, a bentonite clay slurry (drilling mud) would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and stabilize

the open hole. Water required to prepare the slurry of drilling mud would be appropriated from the waterbody in accordance with local and state permit stipulations. Chemical additives may be mixed into the drilling mud to improve drilling conditions. Drilling mud and slurry would be stored away from the waterbody either in tanks, behind earthen berms, or using other methods that would prevent it from flowing off the work area. Drilling mud and slurry would be recycled to the extent practical. After the pipeline is installed, the mud would be disposed of according to applicable regulations.

During drilling, construction personnel would monitor the crossing to detect unanticipated releases of drilling mud to the surface (termed “frac-outs”). Enbridge has prepared a Drilling Mud Containment, Response, and Notification Plan that identifies procedures to address the inadvertent release of drilling mud during HDD operations (Appendix G). The plan includes specific response actions if releases were to occur in wetlands, waterbodies, or upland areas; containment, cleanup, and notification procedures; and steps to be taken to restore affected areas. The plan also lists the containment, response, and cleanup equipment that would be in place on each side of an HDD crossing. If a release is observed during drilling, the appropriate procedures in the plan would be implemented to minimize the potential for drilling mud to reach wetlands, waterbodies, or surface soils adjacent to these features.

Additional information on frac-outs is included in the appropriate resource assessments in Section 4.3.2.

## **Restoration and Revegetation**

The following information on Enbridge’s restoration and revegetation plan applies to waterbodies crossed using the open-cut, open-cut/push-pull, push-pull, and dry crossing methods (dam-and-pump and flume). Streambank and streambed restoration and streambank revegetation usually are generally not necessary when using the HDD method since there is typically no disturbance of these surface features associated with installation using HDD methods.

After the initial restoration activities described above for each crossing method are completed, Enbridge would restore the streambanks as near to pre-construction conditions as practical unless the slope is determined to be unstable. Enbridge’s Environmental Inspectors (see Section 2.7.1) would conduct pre-construction site assessments of the banks of waterbodies to document existing conditions that may affect restoration. The Environmental Inspectors would note historical evidence of circular or wedge failure slumping of the banks, signs of bank erosion, presence of tension cracks in the bank soils, and general soil cohesiveness conditions. Where the slope of a streambank is determined to be unstable or has the potential to erode or fail, it would be reshaped to transition through the disturbed area into the natural streambank, with the intent to stabilize the bank and create a blended, natural appearance. In addition, areas with restoration concerns would be discussed with Enbridge’s construction management team, the contractor, and the applicable agencies to determine the best approach for reestablishing the banks.

For dam-and-pump and flume methods, recontouring would be conducted prior to removing the water flow control devices. If there is a potential for significant bank erosion, the disturbed streambanks would be stabilized with rock riprap or other bank protection measures. However, as stated in Enbridge’s state-specific EMPs (Appendix C), rock riprap would be used only where site-specific conditions require such use and after applicable agency permits or approvals have been acquired. Riprap is not proposed as a primary stabilization method in Minnesota. In the event that riprap is warranted and approved by MNDR, Enbridge engineers or third party consulting engineers, with experience in designing proper riprap installation measures, would be consulted in its design and placement. If riprap is used, jute thatching or erosion control blankets would be installed on the streambanks upslope of the riprap. Where riprap is not used, jute thatching or erosion control blankets would be placed on the entire disturbed bank.

Streambanks would be stabilized and temporary sediment barriers would be installed within 24 hours of completing the crossing (weather and soil conditions permitting) to minimize the potential for sedimentation. During final cleanup, Enbridge would install permanent slope breakers across the full width of the right-of-way to slow surface runoff flows that could cause erosion and carry sediments into the waterbodies. Once the streambanks have been reestablished, they would be seeded in accordance with Enbridge's state-specific Revegetation and Restoration Monitoring Plans (Appendix K), mulch would be applied as needed on slopes, and the seeded areas would be covered with erosion control materials such as jute or its equivalent. Enbridge would consult with the appropriate agencies to identify areas that may need additional site stabilization. Permanent vegetation would be reestablished using seed mixes that include native seed varieties commonly present in the area.

Where necessary for access, the travel lane portion of the construction right-of-way and temporary bridges at water crossings would remain in place until Enbridge completed final cleanup activities. Temporary bridges would be removed after final cleanup, seeding, mulching, and other right-of-way restoration activities had been completed. The temporary erosion control measures would be removed after vegetation is reestablished. Additional information on restoration and revegetation methods is provided in Enbridge's AMP (Appendix F), state-specific EMPs (Appendix C), and state-specific Revegetation and Restoration Monitoring Plans (Appendix K).

#### **2.4.3.3 Construction in Steep Terrain**

Where the proposed pipeline route crosses relatively steep slopes, more grading would be required than in flatter areas. Enbridge has stated that construction in areas in steeper terrain would not typically require a wider construction right-of-way. Grading would be required to create a more moderate slope for safe operation of construction equipment and to accommodate pipe-bending limitations. In areas where the proposed pipeline route extends along the side of a slope, cut-and-fill grading could be required to create a safe, flat working terrace.

In these areas, topsoil would be stripped from the entire right-of-way and stockpiled prior to cut-and-fill activities. Typically, the soil from the high side of the right-of-way would be excavated and moved to the low side to create the level work terrace. After the pipeline is installed, the soil from the low side of the right-of-way would be returned to the high side, the slope's original contours would be restored, and the stockpiled topsoil would be replaced.

Temporary sediment barriers, such as silt fences and straw bales, would be installed during clearing on steeply sloped areas to prevent the movement of disturbed soil into wetlands, waterbodies, or other environmentally sensitive areas. Temporary slope breakers would consist of mounded and compacted soil installed across the right-of-way. Permanent slope breakers would be installed during restoration. After the topsoil is replaced, seed would be applied to steep slopes and the right-of-way would be mulched with hay or non-brittle straw, or covered with erosion control fabric. Sediment barriers would be maintained across the right-of-way until permanent vegetation is established.

#### **2.4.3.4 Road, Highway, and Railroad Crossings**

Enbridge would use one of three construction methods to cross roadways and railroads. For most paved roads and railroads, and for some unpaved roads, Enbridge would use road-boring equipment to bore a tunnel under the crossing area. This method involves digging a pit on each side of the area to be crossed. The pit on the entry side of the boring would be approximately 100 by 75 feet, and the pit on the exit side would be 100 by 50 feet. Boring equipment would be placed in the pits on the entry side and the tunnel would be bored to the exit pit. Tunneling may require several passes of the boring equipment in order to create a hole with sufficient diameter to accommodate the pipeline. In some cases, a larger diameter

“carrier” pipe may be installed first, and the Alberta Clipper pipeline placed within that carrier pipe. When the bore is completed, a prefabricated segment of pipe would be pulled through it and welded to the adjoining sections of pipe.

Enbridge would use the HDD method (described in Section 2.4.3.2) to cross the following roadways and railroads:

- Burlington Northern/U.S. Route 75 (MP 817);
- Railroad and U.S. Route 59 (MP 875);
- Interstate 29 (MP 795.15); and
- U.S. Highway 2/County Road 14 (MP 932.5).

Some unpaved roadways would be crossed using the typical trenching method (open-cut method) described in Sections 2.4.2.6 and 2.4.3.2. To minimize traffic delays at open-cut crossings, Enbridge would establish traffic detours before excavating the roadbed. If no reasonable detours are feasible, at least one traffic lane of the road would be maintained open, except for brief periods when road closure is essential to install the pipeline. Enbridge would complete most open-cut crossings of roadways in 1 day or less and would notify local authorities prior to road closures. In addition, Enbridge would attempt to schedule this type of construction to avoid closing roads during peak traffic hours.

#### **2.4.3.5 Construction near Residences**

Enbridge originally identified 61 residences within 50 feet of the construction right-of-way. However, through easement negotiations and mitigation measures this number has been reduced to 21. Prior to construction, Enbridge would verify the proximity of buildings to the pipeline and develop site-specific mitigation measures for each residence. To keep construction activities within the limits of the construction right-of-way, Enbridge typically would erect temporary fencing along the boundary of the construction right-of-way where it is within 50 feet of a residence. Other mitigation measures could include reducing the workspace in the vicinity of the residence, financial compensation for inconveniences experienced during construction, or acquisition of the residence or the affected portion of the residential property. Additional information on construction near residences is presented in Section 4.9.2.

#### **2.4.3.6 Blasting**

Blasting may be required if bedrock is encountered within the trench. However, the likelihood of blasting is low since (1) blasting was not required for previous pipeline installation within the existing Enbridge corridor; and (2) less than 1 percent of the pipeline route crosses areas with shallow bedrock (bedrock within 5 feet of the surface). All of the area with shallow bedrock is in St. Louis County, Minnesota.

If blasting is required, it would be conducted in accordance with the Enbridge Blasting Plan that is specific to the Alberta Clipper and Diluent Projects (see Section 4.1.2.1 and Appendix L). The Blasting Plan specifies the procedures and safety measures that would be adhered to if blasting is required. The construction contractor would be required to submit a more detailed Blasting Specification Plan that is consistent with the Enbridge Blasting Plan and that presents site-specific information and procedures. The contractor’s plan would need to be approved by Enbridge prior to initiation of blasting and would comply with applicable federal, state, tribal, and local safety and environmental regulations, codes, and standards for the use, storage, and transport of explosives.



Blasting would be conducted only during daylight hours. As a part of the Blasting Plan, Enbridge would conduct pre- and post-blasting tests of any water wells and springs within 150 feet of the construction right-of-way where blasting would be conducted; conduct pre- and post-blasting inspections of residential and commercial structures and utilities within 200 feet of the blasting area; identify municipal water mains in the vicinity of the area where blasting is planned; and notify occupants of nearby structures of the schedule for blasting at least 48 hours prior to the scheduled blasting. If blasting is required for waterbody crossings, Enbridge would consult with the appropriate agencies to develop procedures that would minimize impacts to fisheries resources. Enbridge also would consult with state and federal agencies regarding the potential for sensitive habitats or threatened and endangered species to be present in the vicinity of the blasting area and to establish appropriate measures to be followed that would minimize impacts to those habitats and species.

#### **2.4.4 Construction of Aboveground Facilities**

Construction associated with aboveground facilities (mainline valves and pump station modifications) would involve clearing and grading, as necessary, including some cut-and-fill activities, construction of foundations, and installation of equipment such as new pumps and pipe reconfigurations. The minor amounts of fill that may be needed for the foundations would be obtained from existing commercial pits. Switchgear buildings and buildings used to house the variable-frequency drive equipment would be prefabricated and installed on-site. Pumps would be installed on foundations and would not be housed in buildings.

### **2.5 CONSTRUCTION SCHEDULE AND WORKFORCE**

Enbridge anticipates beginning construction activities for the proposed Project in summer 2009, with work planned to be completed in early 2010. The actual construction schedule would be contingent on gaining all regulatory approvals and permits for the proposed Project by federal, state, tribal, and local agencies (see Section 1.6). The majority of the Alberta Clipper Project (along approximately 305 miles of the alignment) would be constructed during summer and fall 2009; a shorter portion of the Project (approximately 25 miles) would be constructed during winter. As for most major pipelines, the Alberta Clipper Project would be constructed in separate sections, or pipeline construction spreads. Each spread would be constructed as if it were an individual pipeline in the phases described in Section 2.4.2 and depicted on Figure 2.4.2-1 for typical construction methods, or as described in Section 2.4.3 where special techniques are required. Adjacent spreads would be connected during the latter stages of construction of each spread.

Enbridge plans to construct the Alberta Clipper Project using four construction spreads that would work concurrently during the summer and fall construction period and two spreads that would work concurrently during winter construction. Each spread would require a maximum of approximately 300 construction workers. Construction in the summer and fall would extend over a period of approximately 5 to 6 months, and winter construction would take place during a 3- to 4-month period. The locations and lengths of the spreads are listed in Table 2.5-1.

**TABLE 2.5-1**  
**Locations and Lengths of Alberta Clipper Construction Spreads**

Construction Season.	Milepost <sup>a</sup>		Approximate Total Miles
	Start	End	
Summer/fall	773.7	848.0 (Viking Pump Station)	75
Summer/fall	848.0	909.0 (Clearbrook Pump Station)	61
Summer/fall	909.0	996.0 (Deer River Pump Station)	87
Summer/fall	996.0	1098.1 (Superior Terminal) <sup>b</sup>	79
<i>Total miles summer/fall construction</i>			302
Winter	996.0	1003.0 (Prairie River)	7
Winter	1028.0	1045.6 (Floodwood)	18
<i>Total miles winter construction</i>			25
<b>Total miles of Alberta Clipper pipeline</b>			<b>327<sup>c</sup></b>

<sup>a</sup> Mileposts are used for reference and do not reflect actual distances. The proposed pipeline route starts at MP 773.7 and ends at MP 1098.1, a difference of 324.4 miles; however, the actual length of pipeline would be 326.9 miles because of deviations from the existing milepost-reference pipeline.

<sup>b</sup> Does not include winter construction from MP 1028 to MP 1045.6 (18 miles).

<sup>c</sup> Mileages rounded to the nearest whole number; actual total mileage is 326.9.

Installation of new pumps and associated equipment at the existing Viking, Clearbrook, Deer River, and Superior Pump Stations is planned to begin in the second quarter of 2009 and would be completed by the end of 2009. Work at the pump stations would be conducted during a period of approximately 30 weeks, with an average workforce of 14 at each pump station during that period.

## 2.6 OPERATIONS, MAINTENANCE, AND EMERGENCY RESPONSE

Based on the anticipated dates of receipt of all permits, Enbridge currently has a planned in-service date of early 2010. Operation of the Alberta Clipper Project would be incorporated into Enbridge's existing operations and maintenance procedures, including monitoring and emergency response. The Enbridge operations and maintenance program complies with DOT regulations included in 49 CFR Parts 194 and 195 and in other applicable federal and state regulations. Summary information on the existing Enbridge program is presented in the following sections.

- Operations (Section 2.6.1);
- Maintenance (Section 2.6.2);
- Operations Monitoring (Section 2.6.3); and
- Emergency Response (Section 2.6.5).

In addition, operations and maintenance procedures that Enbridge would follow are summarized in Appendix Q (Summary of Enbridge's Pipeline Integrity and Emergency Response Measures).

## **2.6.1 Operations**

Crude oil from the Hardisty Terminal in Alberta, Canada would be transported in the Alberta Clipper pipeline to “breakout” storage tanks at the Clearbrook and Superior Terminals. From those locations, oil would be distributed from these breakout storage tanks into existing pipelines, for delivery to customers through existing pipelines and potentially through pipelines constructed in the future. The composition of the crude oil to be transported is set forth in Enbridge’s tariff that is filed with FERC; this tariff information sets the rules governing the transportation of crude oil by pipeline, including crude oil that is produced from oil sands. In essence, the tariff includes specifications of the crude oil that Enbridge, as a common carrier, would be permitted to accept for transportation through its pipelines and what the specifications should be for the receiver of the crude oil. The specifications require that crude oil with the following characteristics should not be delivered:

- A temperature greater than 38 degrees Celsius;
- A Reid vapor pressure in excess of 103 kilopascals;
- Sediment and water in excess of 0.5 percent by volume;
- A density in excess of 940 kilograms per cubic meter at 15 degrees Celsius;
- A kinematic viscosity in excess of 350 square millimeters per second determined at the reference line temperature;
- Any organic chlorides; or
- Physical or chemical characteristics that may render it not readily transportable by or that may materially affect the quality of other commodities transported.

No special or specific tariff rules or DOT pipeline safety requirements apply to crude oil derived from the oil sands. Enbridge has stated that the sand content of that oil is minimal and poses no integrity problems for the pipeline as long as the above specifications, required for any crude oil shipped through the pipeline, are met.

Information on operation of the Project is provided in the following sections:

- Control Center (Section 2.6.1.1);
- Right-of-Way Inspections and Monitoring (Section 2.6.1.2);
- Training (Section 2.6.1.3);
- Workforce (Section 2.6.1.4); and
- Public Awareness Program (Section 2.6.1.5).

### **2.6.1.1 Control Center**

Enbridge has an existing control center for operation of its pipeline systems. This center would be modified as appropriate to incorporate operation, maintenance, monitoring, and emergency response for the Alberta Clipper Project. The control center, which is staffed by pipeline operators 24 hours per day, includes a computerized pipeline control system that allows operators to monitor and remotely control the pipelines and related facilities. Telephone lines (landlines) and satellite communications are used to exchange computerized data for pipeline monitoring and control. Enbridge also maintains a UHF radio system, supplemented by cellular phones, to facilitate personnel communications during operation, maintenance, and emergency activities.

### **2.6.1.2 Right-of-Way Inspections and Monitoring**

Inspection of the Alberta Clipper Project would be incorporated into Enbridge's current inspection regime that is conducted for the pipelines in the existing corridor, including those portions of the pipeline that would not be in or directly adjacent to the existing Enbridge permanent right-of-way.

Enbridge inspects the entire corridor periodically from the air and portions of the corridor on foot, as conditions permit, but no less frequently than as required by 49 CFR Part 195. The corridor is currently patrolled by air at least once every 3 weeks by an Enbridge-employed pilot who notes unusual activity in or near the right-of-way, or conditions that could indicate potential petroleum releases. If abnormal conditions are noted, ground crews are immediately dispatched for further investigation. If a release is suspected, the pilot notifies the control center by radio, and the affected pipeline may be shut down pending an on-site investigation. As a supplement to the aerial patrol, Enbridge employees visually inspect the right-of-way from the ground in selected locations on a periodic basis. These surveillance activities provide information on possible encroachments and nearby construction activities, erosion, exposed pipe, and other potential concerns that may affect the safety and operation of the pipelines. The combined aerial and ground patrols meet the DOT requirement of inspecting the surface conditions on or adjacent to each pipeline right-of-way at intervals not exceeding 3 weeks, but at least 26 times each calendar year (49 CFR 195.412).

Each calendar year, the cathodic protection systems of the existing pipelines are inspected by measurements of the pipe/structure-to-soil and line currents (where possible). In addition, all rectifiers and anode groundbeds of the system are inspected to ensure proper operation. Repairs and adjustments to the cathodic protection system are made either during the annual survey or during later maintenance activities. At least six times per year, each rectifier and critical cathodic protection interference bond to foreign structures is inspected and corrective measures are taken, if needed. In addition, Enbridge periodically conducts close-interval surveys of the system. Although not required by regulation, this method allows Enbridge to assess the overall effectiveness of the system.

Isolating valves are checked at least twice per year to ensure proper operation. Other components of the pipeline, such as tanks and pump stations, also are routinely inspected. All overpressure safety devices capable of limiting, regulating, controlling, or relieving operating pressures are inspected and tested to ensure that the devices are in good mechanical condition and functioning properly.

In accordance with DOT requirements, Enbridge periodically inspects the pipelines internally with an electronic inspection tool (instrument pig). While the instrument pig travels through the inside of the pipeline, its onboard computers mechanically, ultrasonically, and/or magnetically examine the condition of the pipe. This technique identifies potential problems such as dents, gouges, corrosion, or cracks. The results of the inspection are analyzed; if potential problems have been identified, the pipe is inspected to verify preliminary findings and is repaired as needed.

A commenter requested that the Project's Emergency Response Plan (ERP) be revised to address environmental problems that may result from storms, particularly at waterbody crossings or within 100 feet of waterbody crossings. The procedures that would be followed to address environmental issues after major storms are presented in the state-specific EMPs for the Alberta Clipper Project (Appendix C). As stated in those plans, inspection of erosion and sediment control structures after storm events would initially focus on sensitive resource areas, including those areas in proximity to wetland or waterbody crossings, to identify where modifications and/or repairs are needed. Erosion control devices affected by a storm in those areas would be repaired, replaced, or supplemented with functional structures within 24 hours after discovery, or as soon as field conditions allow access.

Environmental monitoring during construction is described in Section 2.7.

### **2.6.1.3 Training**

Enbridge has a comprehensive orientation, technical, safety, emergency, and on-the-job training program that complies with the Operator Qualification rules issued by PHMSA under 49 CFR Part 195. As personnel progress in pipeline operation and maintenance positions, they receive both formal and on-the-job training. Demonstrations of competence are shown through review of job performance, periodic pipeline control system simulators, emergency exercises, welding certification tests, and other functions required to continue safe pipeline operation and maintenance. All personnel hired to operate the Alberta Clipper Project would be required to participate in this training program.

### **2.6.1.4 Workforce**

Because Enbridge would add operation of the Alberta Clipper Project to its existing pipeline operations program, operation of the Project would not require a substantial number of new employees. Enbridge expects to add six regular employees to its current workforce where operations staff is currently housed.

### **2.6.1.5 Public Awareness Program**

Enbridge has a public awareness program in place for the existing pipeline corridor. This program would be expanded to include the Alberta Clipper Project.

The public awareness program includes a comprehensive public education program for the affected public (those who work and live along the pipeline corridor), excavators, local public officials, and emergency response units of government. The program entails providing emergency response personnel with information in key areas, such as pipeline operation and pipeline safety, how to recognize and respond to pipeline releases, and the locations of pipelines as a way to prevent damage from excavating equipment. As part of keeping the public informed, all Enbridge lines are marked with signage and warnings, in accordance with federal regulations, at road and highway crossings, railroad crossings, navigable rivers, and other locations. This alerts the public to the presence of the pipelines and provides information, contact numbers, and emergency data. Further, Enbridge participates in the One-Call systems in the states along its pipeline alignments.

## **2.6.2 Maintenance**

Enbridge has a comprehensive preventative maintenance program that meets, and in many cases exceeds, the federal safety standards in 49 CFR Part 195. The Alberta Clipper Project would be added to this program, including Project-specific additions to Enbridge's procedures manuals and contract specifications. As a part of the existing program, repair pipe is pre-tested and the components used to make repairs that meet national standards and regulatory requirements. Other procedures, such as welding procedures, movement of the pipe, coating repair, corrosion control, and tank maintenance, are guided by the existing written procedures used by Enbridge and approved by PHMSA inspectors.

Enbridge maintains the right-of-way of its existing pipelines to provide access to the right-of-way and to accommodate pipeline integrity surveys. The new permanent right-of-way for the Alberta Clipper Project would be added to the existing right-of-way maintenance program.

Normal maintenance of vegetation on the permanent right-of-way is accomplished using mechanical mowing or cutting. The existing maintenance program also includes periodic clearing of woody vegetation on the right-of-way. Wetlands are maintained in a non-forested stage in these areas throughout

operation of the pipelines. Enbridge generally does not mow herbaceous growth within wetlands as a part of its maintenance program. Cultivated croplands (such as wheat and corn) are allowed to grow in the permanent right-of-way.

### **2.6.3 Unauthorized Use of the Right-of-Way**

We received a comment expressing concern about unauthorized use of ATVs on the Enbridge right-of-way during Project operation. The unauthorized use of ATVs on the Enbridge right-of-way constitutes trespassing and is not allowed by law. Although it is not feasible for Enbridge to police its entire right-of-way for unauthorized ATV use, Enbridge has stated that it is willing to consider site-specific measures, in cooperation with MDNR and landowners, that could curb ATV traffic near sensitive resources. In addition, Enbridge would install off-road vehicle control measures as requested by landowners at points of entry. Such measures may include fences and gates, or placement of other barriers such as boulders or timber barriers. Visual screenings may be installed to deter use of the pipeline corridor from unauthorized activities.

### **2.6.4 Operations Monitoring**

#### **2.6.4.1 Pipeline Control System**

Enbridge's Supervisory Control and Data Acquisition (SCADA) system is the central component of its existing pipeline control system. The Alberta Clipper Project would be incorporated into the existing SCADA system.

The Enbridge SCADA system consists of pipeline sensing devices (including pressure, temperature, density, and flow sensors), a remote computer at each Enbridge pump station, a real-time communications network, a centralized data processing system, and a complete data display that is available to the pipeline control operator. The system includes automated alarms to warn operators when measurements depart from pre-determined maximum and minimum limits.

The SCADA system reduces control errors and can automatically initiate pump station shutdowns to maintain safe operating pressures. Pipeline control operators also can manually initiate pipeline shutdown when they observe or suspect abnormal conditions. Enbridge enforces a "10-minute rule" that requires operators to shut down a pipeline within 10 minutes of observation of an abnormal condition that cannot be attributed to normal fluctuations in pressures and operating conditions. Studies using SCADA simulations indicate that the system can reliably identify a release as low as approximately 5 percent of system capacity. For the proposed Project, this would equate to approximately 938 barrels per hour (16 barrels per minute).

#### **2.6.4.2 Small Release Detection System**

To detect smaller releases, Enbridge operates a Computational Pipeline Monitoring System, which is essentially a subsystem to the SCADA system. This system refines data monitoring to better analyze much smaller deviations in flow than possible with the existing SCADA system. Enbridge installed these additional components, such as pressure transmitting devices, in sensitive areas to increase the ability to remotely detect small releases. Enbridge would install similar devices in sensitive areas for the Alberta Clipper Project and incorporate them into its Computational Pipeline Monitoring System.

## **2.6.5 Emergency Response**

The Alberta Clipper Project would be incorporated into Enbridge's existing corporate emergency response program. This program includes pre-planning, equipment staging, notifications, and emergency and release containment procedures. Enbridge's resources and response capabilities are subject to periodic review by agencies with jurisdiction to enforce the Oil Pollution Act of 1990; this includes on-site inspections or performance of unannounced drills conducted by the appropriate agency. Key components of the existing program are described discussed below, and emergency response procedures used by Enbridge are summarized in Appendix Q.

### **2.6.5.1 Emergency Response Plan**

Enbridge's existing ERP for its pipeline system has been reviewed by PHMSA and complies with the requirements of 49 CFR Part 194, as well as requirements of the Occupational Safety and Health Administration (OSHA) in its final rules on Hazardous Waste Operations and Emergency Response (HAZWOPER). The ERP would be amended to incorporate the Alberta Clipper Project and would be submitted to PHMSA for review and approval prior to operation, as required by 49 CFR 194. The amended ERP would include the names and contact information of individuals with responsibility for actions if a spill or other emergency situation were to occur, including people within Enbridge and within the agencies and public service organizations that would respond to an emergency.

The existing ERP addresses compliance with public and employee safety issues, including implementation of the Incident Command System, training of response personnel, protection requirements, site control procedures, and decontamination. The ERP is maintained at district, area, and pipeline maintenance offices. Enbridge employees are provided a copy of an Emergency Response Directory that provides checklists, summaries from the plan, internal and external contacts, and notification/reporting procedures.

As a part of the ERP, Enbridge maintains detailed mapping of its pipeline system using both publicly available map resources and an electronic geographic information system (GIS). The Alberta Clipper Project would be incorporated into the existing maps. Enbridge uses the maps to evaluate potential impacts on sensitive environmental and human use areas, and to develop site-specific plans to respond to emergencies.

A summary of the emergency response procedures that Enbridge would follow is presented in Appendix Q (Summary of Enbridge's Pipeline Integrity and Emergency Response Measures).

### **2.6.5.2 Staffing**

Enbridge employs pipeline maintenance crews that are strategically located along the pipeline system in accordance with the approved ERP. Each crew member is trained and equipped to respond to an emergency. Each pipeline maintenance facility has mobile response units (equipped for both land- and water-based releases) and heavy equipment. Pre-staged containment and recovery equipment is maintained and available at several other locations along the Enbridge system.

Enbridge also has pre-selected response contractors to supplement its internal resources as necessary, and is active in several industry and government cooperatives and mutual aid groups to facilitate emergency response.

### **2.6.5.3 Training**

Enbridge personnel receive both classroom and practical training in safety and emergency response procedures, and are required to demonstrate knowledge and proficiency in these areas as appropriate to their responsibilities in accordance with the approved ERP. Each employee also receives job-specific training as required by the DOT operator's qualification program. In addition, all pipeline maintenance, electrical, and mechanical staff are trained to a "Hazardous Materials Technician" designation based on OSHA's HAZWOPER requirements.

As part of its training program, Enbridge requires each pipeline maintenance crew to be involved in at least two emergency response exercises per year. These may consist of written exercises, communication exercises, announced or unannounced deployment exercises, and other simulations. Fire-fighting exercises also are conducted. Enbridge's exercise and drilling requirements are consistent with the requirements of 49 CFR Part 194.

## **2.7 ENVIRONMENTAL COMPLIANCE, INSPECTION, AND MITIGATION MONITORING**

Environmental monitoring would be conducted during and after construction of the Alberta Clipper Project. Monitoring during operation is described in Section 2.6.1.

During construction, Enbridge would implement a comprehensive inspection, monitoring, and compliance control plan that would address the work of all multiple contractors to ensure compliance with the requirements of permits, plans, and landowner agreements. Enbridge's land agents would be the primary contact between contractors and landowners. Prior to the initiation of construction, the contractor would be provided with a landowner line list that identifies specific commitments made to individual landowners. During construction, the land agents would work with the contractor's field offices to ensure compliance with landowner agreements. They would also work with landowners to identify and address additional concerns that may become evident as construction progresses.

Environmental inspections would be conducted in accordance with the requirements of the Enbridge Construction Environmental Control Plan (Appendix M). The plan has been developed for both the LSr and Alberta Clipper Project, and was developed based on consultations with MDNR, the Minnesota Department of Agriculture, MPCA, WDNR, and the St. Paul District of the COE. The plan defines the roles and responsibilities of personnel implementing the environmental requirements, describes the reporting structure that would be used to document compliance during construction, and presents training events that would be required to communicate the environmental requirements to construction personnel.

As a part of its environmental monitoring program, Enbridge would also monitor the restored right-of-way in non-agricultural areas for the presence of noxious plants and invasive species. Those areas would be considered successfully restored when the density and cover of the non-nuisance vegetation are similar to those of the adjacent undisturbed lands. If the nuisance vegetation density and cover along the restored right-of-way are higher than desired, Enbridge would take the appropriate measures to control the vegetation. These methods could include herbicide spraying, mowing, and burning.

The responsibilities for environmental monitoring are described below for the Enbridge Environmental Inspectors (Section 2.7.1), tribal monitors (Section 2.7.2), and the third-party (independent) environmental monitors (Section 2.7.3).



### **2.7.1 Environmental Inspectors and Compliance Tracking**

Enbridge would hire Environmental Inspectors to monitor compliance with the environmental protection and mitigation measures included as permit conditions and in contract specifications, as well as the environmental concerns of landowners along the construction right-of-way. The Environmental Inspectors would also provide ongoing oversight for day-to-day environmental issues that may arise. The inspectors would have the authority to stop activities and order corrective mitigation for actions that fail to comply with the environmental requirements imposed on the Project, including landowner agreements. Enbridge would employ three to four Environmental Inspectors at each pipeline spread.

Enbridge would conduct Project-specific training for the Environmental Inspectors. The training would include a detailed explanation of the mitigation measures that would be required as well as the roles and responsibilities of the Environmental Inspectors during construction. Training for cultural resources concerns would be conducted by a professional who meets the standards presented in the Programmatic Agreement (PA) (Appendix R); this individual would provide Project-specific training in historic preservation and identification of archaeological, historic, and/or cultural resources. Enbridge also would provide information from appropriate sources on the identification of and avoidance methods for previously identified sensitive tribal biological species (additional information on tribal monitoring is provided in Section 2.7.2 and Appendix R).

Information on compliance provided by the Environmental Inspectors would be entered into the Enbridge database of commitments, permit conditions, and regulatory requirements. Enbridge would assign one compliance tracking clerk to each pipeline spread to maintain the database and record compliance or noncompliance with each line item in the database.

### **2.7.2 Tribal Monitors**

Tribal monitors would also be included in the construction-monitoring program. Tribal monitors would need to be specifically designated by signatory or consulting tribes and complete the Enbridge training program; that program would include topics such as safety, construction practices/activities, environmentally sensitive areas, PA requirements, and responsibilities as described in applicable Project plans, such as the state-specific Unanticipated Discovery Plans.

Tribal monitors would work in an advisory role with Enbridge's environmental inspection team to assist the Project in achieving compliance with the PA and to protect known cultural resource sites as well as sites that may be discovered during construction. Tribal monitors would communicate directly with Enbridge's Environmental Inspectors and with Enbridge's environmental inspection team if concerns are identified.

The tribal monitors would have access to the construction area as needed to conduct their work and would be invited to attend construction meetings where compliance issues are discussed. Tribal monitors would monitor construction activities during the clearing, grading, and trenching phases of construction in the following areas:

- Within reservation boundaries;
- Along 17.1 miles of new right-of-way (greenfield);
- Within 300 feet of known archaeological site boundaries that are eligible for listing or previously listed in the National Register of Historic Places (NRHP) at the time of construction that have been identified in the area of potential effect (APE); and

- Within 300 feet of known traditional cultural properties (TCPs) that are eligible for listing or previously listed in the NRHP at the time of construction that have been identified in the APE.

In the event that cultural materials are discovered during construction, activities would be temporarily suspended at that location in accordance with Enbridge's state-specific Unanticipated Discovery Plans, and the tribal monitor, if not present, would be notified. Enbridge would seek the advice and input of the tribal monitor, if available, should an unanticipated discovery be encountered. Enbridge will also be conducting tours of the Project corridor for several Indian tribes prior to the commencement of any construction so that additional areas of cultural interest or concern to the Indian tribes can be identified by tribal members and elders. If additional areas of cultural interest are identified and if requested by the tribes, Enbridge would utilize tribal monitors in those areas. Additional information on the process for coordination with applicable tribal representatives and Unanticipated Discovery Plans, see the PA in Appendix R.

### **2.7.3 Third-Party Environmental Monitors**

One third-party (independent) environmental monitor would be assigned to each pipeline spread. The independent environmental monitor would be selected jointly by MDNR, WDNR, the Minnesota Department of Agriculture, and the COE; Enbridge would fund the position. The independent environmental monitors would document compliance with the environmental requirements of permits and Enbridge's construction-related plans. They would function essentially as auditors to verify compliance while working collaboratively with Enbridge's Environmental Inspectors. The monitors would verbally communicate their findings with the Environmental Inspectors and would submit daily reports to the applicable agencies and Enbridge. Third-party environmental monitors would not communicate directly with the Enbridge construction contractor or sub-contractors unless an Enbridge Environmental Inspector is present, and they would not have the authority to direct construction team activities. If the independent Environmental Inspectors identify compliance issues, they would work with the Environmental Inspectors to achieve compliance and report the issues to the agencies.

## **2.8 FUTURE PLANS AND ABANDONMENT**

### **2.8.1 Future Plans**

The proposed Alberta Clipper Project would have a maximum design capacity of 500,000 bpd, with an expected average annual capacity of 450,000 bpd. With installation of additional pumps, the annual capacity could be increased to 800,000 bpd. This increase in capacity would require new pumps or upgrades to existing pumps at seven stations in the United States: the Donaldson, Viking, Plummer, Clearbrook, Cass Lake, Deer River, and Floodwood Pump Stations. New 6,000-horsepower pumps would need to be installed at Donaldson (three new units), Plummer (two new units), Cass Lake (three new units), and Floodwood (three new units). The remaining sites (Viking, Clearbrook, and Deer River) would require new pump impellers and related modifications. The increase in capacity to 800,000 bpd would not require any modifications to the Alberta Clipper pipeline itself.

Although the capacity of the proposed Alberta Clipper Project could be increased with those upgrades, Enbridge does not have any plans to expand the Project. If Enbridge proposes to increase the capacity of the Project in the future, the proposed changes to the system would be reviewed by the appropriate federal, state, tribal, and local agencies, including reviews of potential environmental impacts.

## **2.8.2 Abandonment**

The proposed Project is expected to operate for 50 years or more. At this time, Enbridge has not submitted plans for abandonment of the facilities at the end of the Project's operational life. Abandonment plans would be submitted to the appropriate agencies for review and approval prior to abandonment of the pipelines. The planned abandonment procedures would be responsive to regulations that are in place at the time.

## **2.9 CONNECTED ACTION – SUPERIOR TERMINAL EXPANSION PROJECT**

Enbridge is proposing to expand the existing Superior Terminal to accommodate the crude oil that would be shipped there by the Alberta Clipper pipeline. The Superior Terminal Expansion Project, which would be constructed within the boundaries of the existing terminal, is separate from the proposed Alberta Clipper Project action and is not part of the Presidential Permit application submitted by Enbridge. While DOS has no permitting or regulatory authority over the Superior Terminal Expansion Project, DOS has determined that the proposed Superior Terminal Expansion Project is a connected action for the purposes of its NEPA review because the expansion is being undertaken as a direct result of the increased volume of crude oil that would be delivered at that location by the proposed Alberta Clipper pipeline. Although the permit applications for that project would be reviewed and acted on by other agencies, the potential impacts of its construction and operation are discussed in the resource sections of this EIS. Information on the design, construction, and operation of the Superior Terminal Expansion Project is presented below. Section 3.6 addresses alternatives to the proposed Superior Terminal Expansion Project, and Appendix S presents Enbridge's analysis of alternatives to the proposed expansion project.

### **2.9.1 Project Summary**

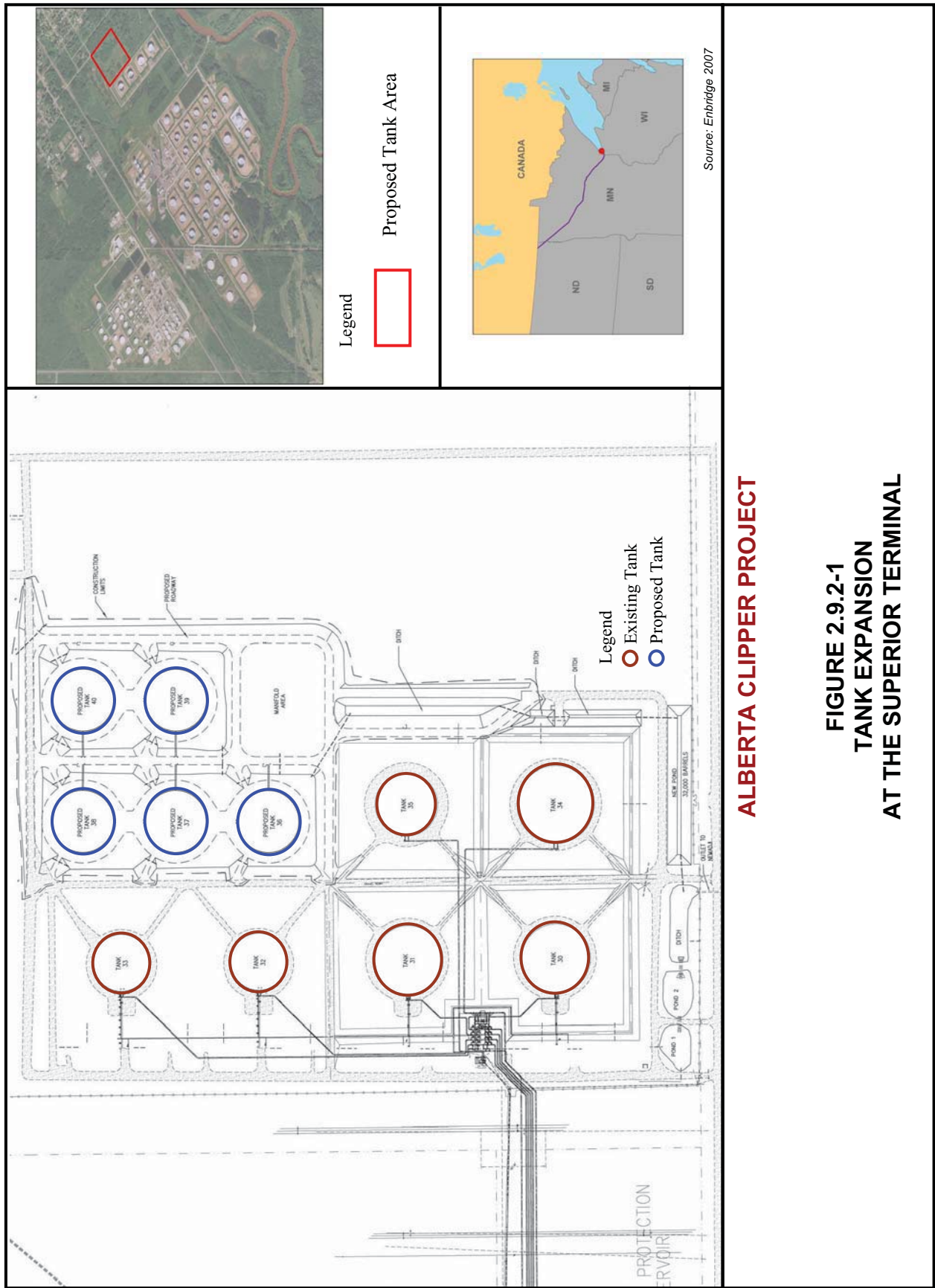
The proposed Superior Terminal Expansion Project would be constructed on the existing Enbridge terminal at Superior, Wisconsin. The terminal is a 167-acre site used as a pipeline "breakout facility."<sup>5</sup> Key facilities at the existing terminal include a central crude oil receipt and distribution manifold, 35 storage tanks, pumps, a substation, electrical switchgear buildings, and other equipment associated with operation of the terminal. For the purposes of this EIS, the expansion project is considered to consist of two primary components: (1) construction and operation of five new storage tanks and associated facilities; and (2) construction and operation of a 4,600-foot facility line to transport the crude oil transported by the Alberta Clipper Project from the terminus of the mainline within the Superior Terminal to the storage tanks via the central manifold.

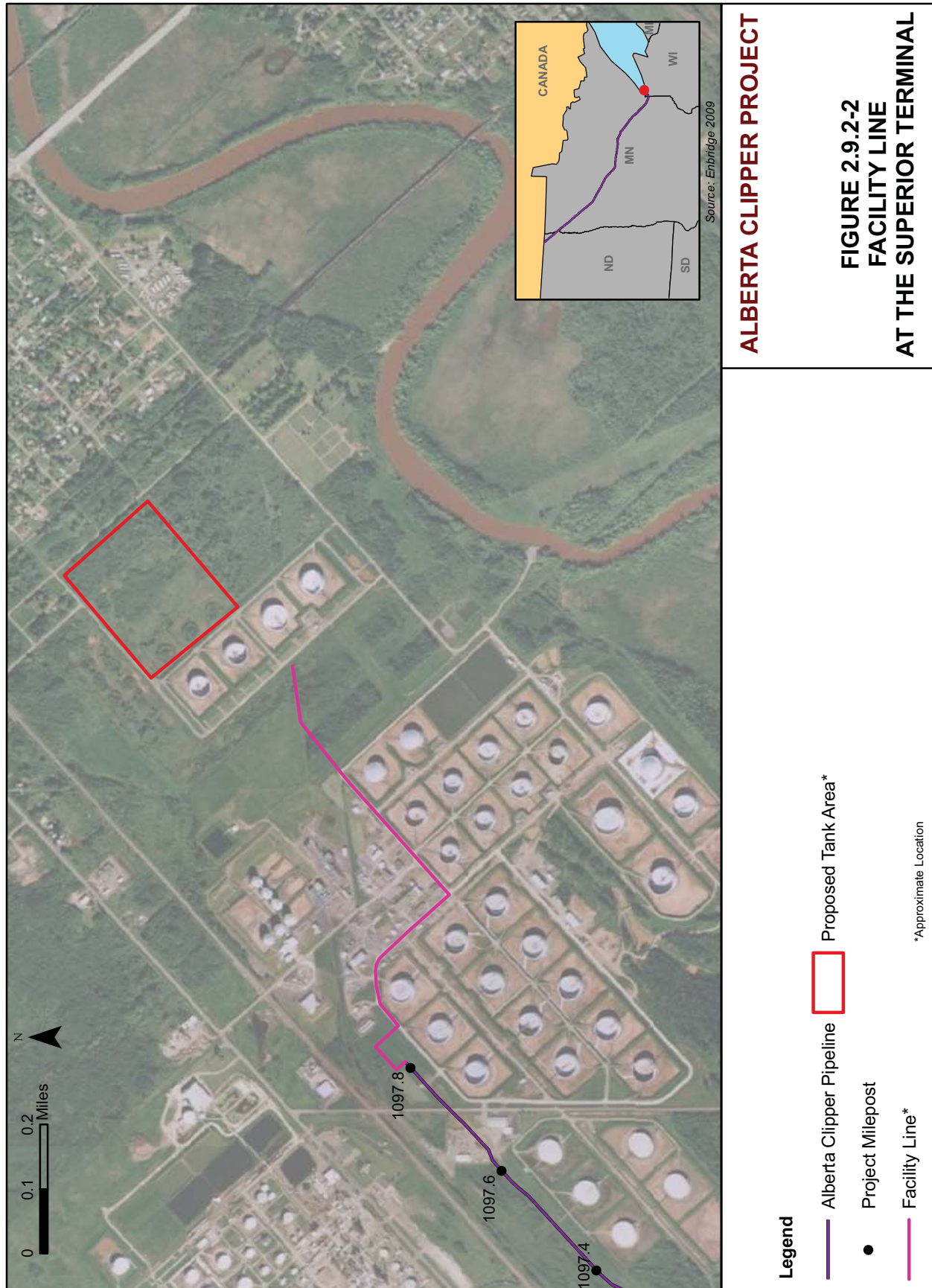
The tank expansion would consist of five new storage tanks, five new distribution pipelines from the facility line, three new pumps, electrical equipment, and other associated facilities. The electrical support facilities would consist of a power supply, electrical equipment, and a building to house the equipment.

Figures 2.9.2-1 and 2.9.2-2 depict the location and primary components of the proposed expansion project.

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<sup>5</sup> 49 CFR 195.2 defines a "breakout tank" as one "used to (a) relieve surges in a hazardous liquid pipeline system, or (b) receive and store hazardous liquid transported by a pipeline for re-injection and continued transportation by pipeline." The Superior Terminal consists of breakout tanks and associated facilities.







## **2.9.2 Proposed Facilities**

### **2.9.2.1 Tank Expansion**

Enbridge has proposed to install five new storage tanks at the Superior Terminal, each with a maximum capacity of approximately 250,000 barrels and a working storage capacity of approximately 206,000 barrels. The new tanks and all associated equipment and facilities would be installed inside the existing boundaries of the terminal, as depicted in Figure 2.9.2-1; the total area of the site would be approximately 18.9 acres.

Each storage tank would be approximately 180 feet in diameter and approximately 56 feet in height. The tanks would be welded steel construction with external floating roofs and would be painted white. A dike would surround each tank or multiple tanks.

Each tank would have a high-expansion foam-rim fire-protection system and would be designed for connection to a portable foam trailer in the event of a fire. The existing firewater mains of the terminal would be extended around the tanks, and firewater hydrants with monitors would be installed on the extensions. No new firewater pumps would be required.

A new 36-inch-diameter bi-directional pipeline would be installed between each tank and the existing central manifold at the terminal. The pipe design of each of the five new pipelines would be generally as described in Section 2.2.2.1. Five booster pumps would be installed near the storage tanks to transfer oil from the tanks to the central manifold; each pump would be able to transport oil from any of the new tanks. Each booster pump would be electrically driven, with a capacity of 412,500 bpd. The booster pumps would not be housed within buildings.

Electrical service would be provided by a new overhead pole line that would connect to the existing substation on the north side of the terminal. A new breaker would be installed at the substation, and a switchgear building would be installed to house the electrical and control equipment. The prefabricated, pressurized switchgear building would be approximately 53 feet long, 14 feet wide, and 10 feet wide and would include HVAC units to cool the switchgear and a station service transformer. The electrical equipment would be used to provide electrical service to both the tank farm and pump station portions of the expansion project.

### **2.9.2.2 Facility Line**

A new 4,600-foot facility line would be constructed between the terminus of the mainline and the five new storage tanks, as depicted in Figure 2.9.2-2. Specifically, the facility line would extend 2,300 feet from the pig launching facility just east of the mainline crossing of Bardon Avenue, east and south to the existing central manifold near 21<sup>st</sup> Street. From the central manifold, the facility line would extend approximately 2,300 feet due east to the new breakout tanks, where it would connect with new distribution pipelines to the individual tanks.

## **2.9.3 Land Requirements**

### **2.9.3.1 Tank Expansion**

The new tanks would be installed on a 14.1-acre site that is within the property boundaries of the 167-acre Superior Terminal. Pipelines installed between the 14.1-acre site and the central manifold also would be within the boundaries of the terminal.

### **2.9.3.2 Facility Line**

The 36-inch facility line would be constructed within the Superior Terminal and primarily would be collocated along terminal roadways and tank dikes. Based on an estimated 30-foot construction right-of-way, the installation of the facility line would temporarily impact approximately 3.2 acres of developed land.

## **2.9.4 Construction**

### **2.9.4.1 Tank Expansion**

Cut-and-fill operations would be required to prepare the site for construction of the tanks and the associated foundations. Approximately 30,000 cubic yards of fill would be required for each tank (approximate total of 150,000 cubic yards), and approximately 3,000 cubic yards of gravel would be required for each tank (approximate total of 15,000 cubic yards). These materials would be obtained from existing commercial pits in the Superior area.

The storage tanks would be constructed on-site. Components would be brought to the construction site by truck and stored on the site. The maximum size of the tank components would be approximately 10 feet by 15 feet.

Trenching, installation, and other construction activities for the new pipelines would generally be accomplished as described in Section 2.4.2. The top of each pipeline would be at least 36 inches below the ground surface in compliance with DOT and Wisconsin regulations. Each pipe would be hydrostatically tested using water from the on-site fire ponds; after testing, the hydrostatic test water would be returned to the ponds in accordance with the terminal's existing Wisconsin Pollution Discharge Elimination System permit.

### **2.9.4.2 Facility Line**

Similar to the installation of the connector pipes for the storage tanks, the facility line would be installed as described in Section 2.4.2 and in compliance with DOT and Wisconsin regulations. The facility line also would be tested using water from the on-site fire ponds; after testing, the hydrostatic test water would be returned to the ponds in accordance with the terminal's existing Wisconsin Pollution Discharge Elimination System permit.

## **2.9.5 Construction Schedule and Workforce**

Enbridge plans to begin construction of the Superior Expansion Terminal Expansion Project in summer 2009, with completion planned for early 2010, subject to receipt of the necessary permits, approvals, and authorizations; however, the actual schedule will be dependent upon the decisions of the agencies reviewing the applications for the proposed Project. An average of 30 workers per day would be required during the construction period.

## **2.9.6 Operations, Maintenance, and Emergency Response**

The Superior Terminal receives and ships approximately 75 types of crude oil. Crude oil entering the facility is "staged" in tanks prior to shipment to customers in batches (a batch is typically about 63,000 barrels). Crude oil delivered by the Alberta Clipper Project would be directed to the central manifold at the Superior Terminal and then transported by pipeline to the new tanks for staging. Crude oil from each storage tank would be pumped back to the central manifold through its dedicated bi-

directional pipelines; from the central manifold, crude oil would be transported out of the Superior Terminal through the existing oil distribution system.

Enbridge would expand its existing operations, maintenance, and emergency response programs to include the Superior Terminal Expansion Project. The existing programs are described in Section 2.6.

### **2.9.7 Environmental Compliance, Inspection, and Mitigation Monitoring**

Enbridge would expand its existing environmental compliance, inspection, and mitigation monitoring programs to include the Superior Terminal Expansion Project. Those programs are described in Section 2.6.

### **2.9.8 Future Plans and Abandonment**

The proposed Project is expected to operate for 50 years or more. At this time, Enbridge has not submitted plans for abandonment of the facilities at the end of the operational life of the Project. Abandonment plans would be submitted to the appropriate agencies for review and approval prior to abandonment of the terminal. The planned abandonment procedures would be responsive to regulations that are in place at the time.

### **2.9.9 References**

Enbridge. See Enbridge, Inc.

Enbridge, Inc. 2007. Environmental Assessment: Alberta Clipper Pipeline Project. Prepared for the U.S. Department of State, Washington, D.C. Prepared by Natural Resources Group, Inc., Minneapolis, Minnesota.

Enbridge, Inc. 2009. Responses to Data Requests dated February 18, 2009, February 22, 2009 and April 1, 2009. Provided to the Department of State from February 18, 2009 through April 30, 2009